



BIOINTERPRETER

New Biological Perspective to your Differentials



#259, 4th Cross, "Apurva Buildings", 80 feet
Road, RMV 2nd Stage, Bangalore-560094, India
Telephone : +91-80-40538300/200
Telefax: +91-80-40538222 / 333
International Hotline: +1(415) 283 9698
Email: contact@genotypic.co.in



❖ Getting Started

- ◆ [About Biointerpreter](#)

❖ Features

- ◆ [Highlights](#)
- ◆ [Overview](#)
- ◆ [Biointerpreter: Design and Contents](#)

❖ User registration and Login

- ◆ [Login Registration](#)
- ◆ [Login page](#)

❖ Searching & Results

- ◆ [Search options](#)
 - [Gene Identifier types](#)
 - [Paste IDs](#)
 - [Study name](#)
 - [P value cutoff](#)
 - [Search Examples](#)
- ◆ [What do I get?](#)
 - [Summary Report](#)
 - [Explain - Categories](#)

❖ Explanation of results

- ◆ [Viewing the result categories & interpretation of results](#)

Getting Started

About BioInterpreter:

A web based , efficient and easy to use interpretation tool that gives quick and complete interpretation of Microarray data by significantly reducing the analysis time from hours to minutes.

Features

Highlights:

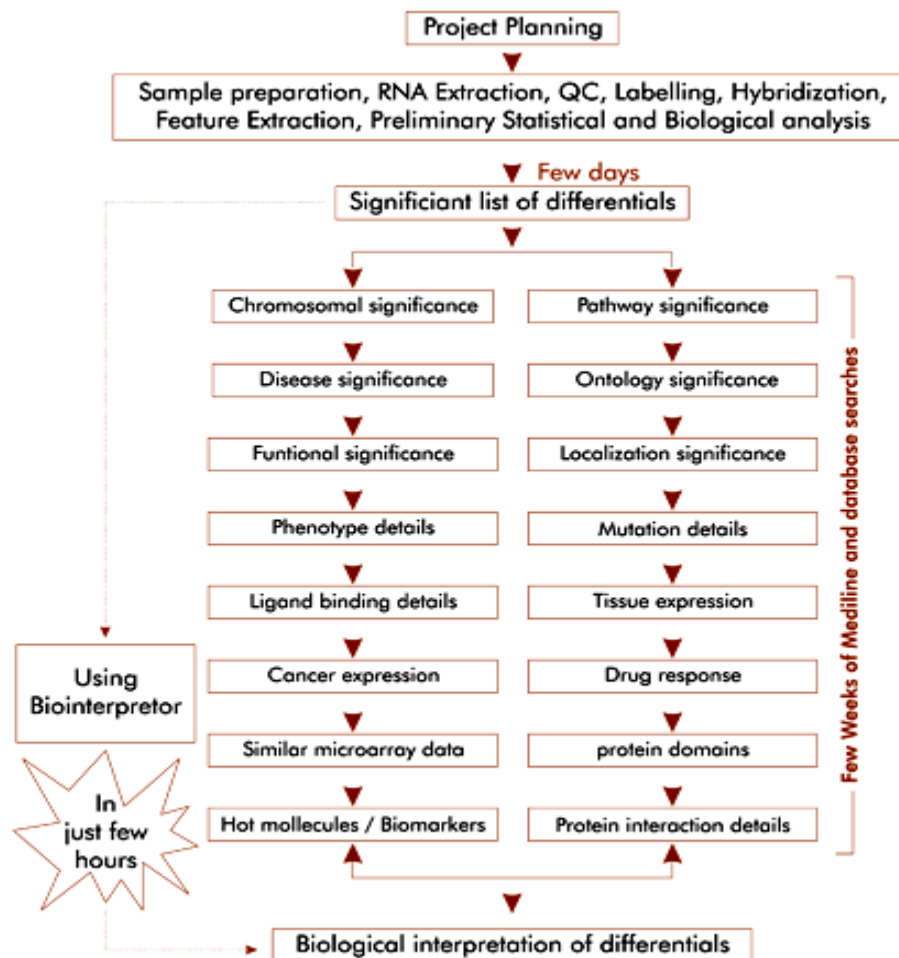
- Helps derive full value of your Microarray study
- Automated biological analysis of Microarray data: saves weeks without compromising on depth of information
- Web-based, easy to use tool. Specially designed for the users who are most likely to be biologist.
- Only tool providing curated gene expression data.
- Flexibility to query with more than 12 gene identifier types.
- Provides more than 15 biological views of the genes viz. function, pathway, disease, etc.
- Biologist friendly: Advanced Excel and database skills not required
- Comes from India's first Microarray Company.
- [Attention Microarray users, with Biointerpreter you can now query with your Mouse IDs and compare to human data.](#)

Overview:

Your microarray projects generate clusters of hundreds to thousands of differentially expressed genes. Even with the help of comprehensive information resources and specialized skills, you could spend weeks to derive biological significance from these gene clusters. Finally, in the interest of time, the most interesting biological significances are picked up, often missing the subtle and not so obvious ones. You might worry that you may not have fully realized the value of your microarray data.

[The Microarray workflow below shows how quickly Biointerpreter performs the biological interpretation of differentials as compared to any other tool that typically takes few days time to complete the analysis.](#)

Microarray Work Flow & Biointerpreter



Here, we understand that the various open source and commercial tools available for biological data analysis, provides answers to different pieces of puzzles but when all these pieces are combined to make a sense. The result is again a puzzle or confusion. The biggest part of the confusion is deriving biological significance using curated and comprehensive gene expression and literature data from other studies- is still not available from any other source or tool.

Biointerpreter

Genotypic's Biointerpreter allows you to confidently analyze your microarray data without the issues that you face today.

- Provides 15 different biological views using different parameters like genomic location, pathways, diseases, drug response, and so on. This makes Biointerpreter a truly comprehensive resource that would definitely work the best for you.
- Can decipher the significance of a gene list in minutes. This saves you enormous amounts of time and effort.
- Allows you to query using diverse gene identifiers (17 different gene ids like Affymetrix, Agilent, Genbank, Unigene, etc). Biointerpreter combines the facilities provided by multiple tools using any ID type.
- Allows you to drill down to the source of information, allowing you to quickly validate the reliability of the information.
- Allows you to switch between organisms at will, a unique feature of Biointerpreter. For example, for a list of mouse genes, you can view the biological significance of homologs genes in human database.
- Helps you to readily identify hot molecules like cancer markers, drug targets etc hidden in your list. You will not miss important genes that control key processes.

Biointerpreter: Design and Contents

Biointerpreter is designed based on Genotypic's more than 6 years experience in microarray analysis services. The suggestions and requirements of microarray users worldwide have been translated to a highly efficient user friendly product. It contains comprehensive and verified annotations from various sequence and annotation databases. Contains microarray data tables from over 500 publications and is constantly growing. Data curated from over 500,000 Pubmed abstracts and topic specific Databases are used to index genes for disease, function, drug associations and other 15 classes. The database is updated every month.

User registration and Login

Login Registration

If you are a new user, please register [here](#). Your Login details will be sent to you on the E-mail provided during registration.

Login page

Your email ID is the Login ID, the password is case sensitive. If the server is busy with other requests it will take up to 10 seconds for logging into the program. If the login fails, check internet connection by visiting other sites. If you can reach other websites, try logging again. If the login fails repeatedly, try logging into the [Mirror Server](#). If you are using a Demo account, verify if you have exceeded the number of logins or the demo period is completed. You can always write to biointerpreter@genotypic.co.in to obtain a new demo login or purchase a subscription.

Existing users login [here](#)

New user? - Register [here](#)

This is the Biointerpreter Login page. Submit your login information and click Sign In.



[Home](#) | [About Biointerpreter](#) | [Instructions](#) | [Purchase](#) | [Register for Demo](#) | [Brochure](#)

Sign in to Human Biointerpreter (Version 1.1)

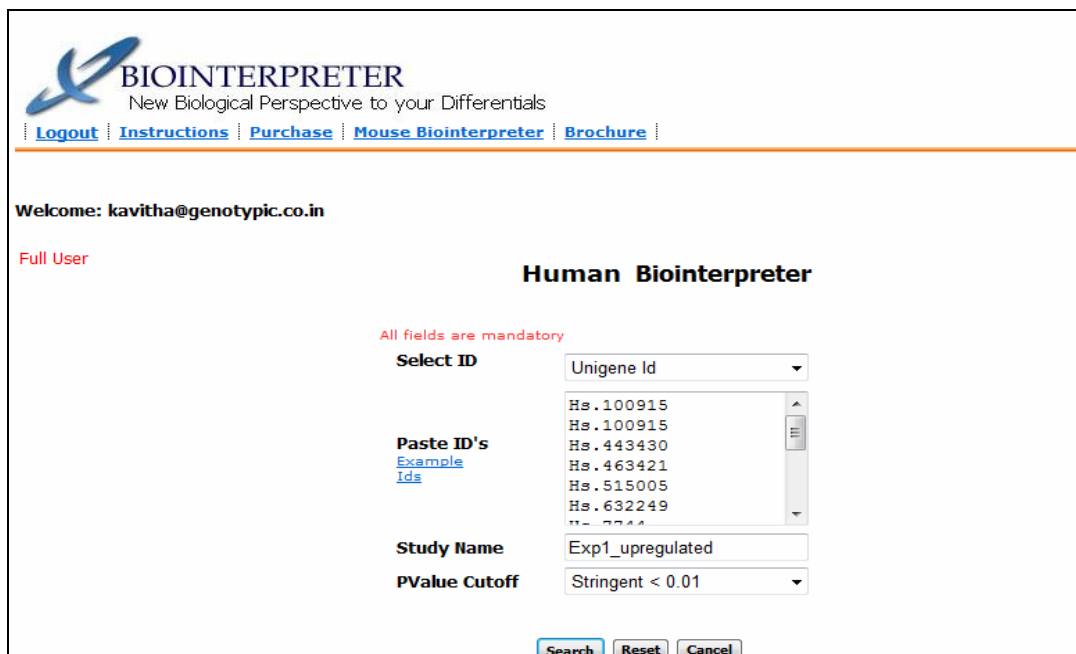
Login	usergenotypic
Password	•••••
	Sign In Cancel

If the login fails, please follow these steps.

1. Make sure 'Allow Cookies' is enabled in your browser.
2. If you are using demo account, make sure that you have not exceeded the maximum login limit, which are 20 or 15 days from the first Activation Date.
3. If you cannot remember the password, please write to biointerpreter@genotypic.co.in

Searching & Results:

Once you reach the Biointerpreter Query page, you can analyze your gene list with Biointerpreter. Biointerpreter is an online tool with user friendly web interface. It is biologists' friendly too, no special training such as advanced Excel needed to use the tool.



The screenshot shows the Biointerpreter web interface. At the top, there is a logo and the text "BIOINTERPRETER New Biological Perspective to your Differentials". Below this are links: "Logout", "Instructions", "Purchase", "Mouse Biointerpreter", and "Brochure". A welcome message says "Welcome: kavitha@genotypic.co.in". The user is identified as "Full User". The main heading is "Human Biointerpreter". A note states "All fields are mandatory". The form includes:

- Select ID:** A dropdown menu currently showing "Unigene Id". Below it is a list of gene IDs: Hs.100915, Hs.100915, Hs.443430, Hs.463421, Hs.515005, Hs.632249, and Hs.777777.
- Paste ID's:** A text input field with a link to "Example Ids".
- Study Name:** A text input field containing "Exp1_upregulated".
- PValue Cutoff:** A dropdown menu showing "Stringent < 0.01".

 At the bottom of the form are three buttons: "Search", "Reset", and "Cancel".

Search options

❖ Gene Identifier types

Biointerpreter allows you to query different types of gene Identifiers. The gene identifiers could be any one of the following.

- Unigene
- NCBI Gene ID
- Gene Symbol
- Genbank nucleotide accession
- Genbank protein accession
- Agilent ID
- Affymetrix ID
- Ensembl ID
- PIR Accession
- Nucleotide GI
- Protein GI
- Swissprot accession
- Swissprot ID

- TIGR ID
- Searching the Human database with Mouse Agilent IDs, Affymetrix IDs and Gene symbol.
- Searching the Human database with Rat Agilent IDs, Affymetrix IDs and Gene symbol.
- Agilent Chip on Chip ID's.

You can choose the desired ID type from the drop down menu.

❖ *Paste IDs*

Copy your gene list and paste in the box provided. For example we have provided some ids of different type, to access those ids click Example IDs link.

Note: The IDs should be separated by carriage return i.e. each ID should be in a separate line. The gene identifier type should be unique. i.e. All IDs should be of same ID type.

❖ *Study name*

Type the study name in the box provided. (Study name is for your reference, it does not change the way program works)

Now click on the 'Submit' button.

❖ *P value*

P value is the short term for Probability value.

It tells us about the probability of getting significant result from your list when compared to population. Chi-square test has been used to calculate the P value. Chi-square is a common statistical method used to compare the observed data and expected data. Usually P value less than 0.05 considered as significant.

❖ **Search Examples**

Example 1



BIOINTERPRETER
New Biological Perspective to your Differentials

[Logout](#) | [Instructions](#) | [Purchase](#) | [Mouse Biointerpreter](#) | [Brochure](#)

Welcome: kavitha@genotypic.co.in

Full User

Human Biointerpreter

All fields are mandatory

Select ID Unigene Id

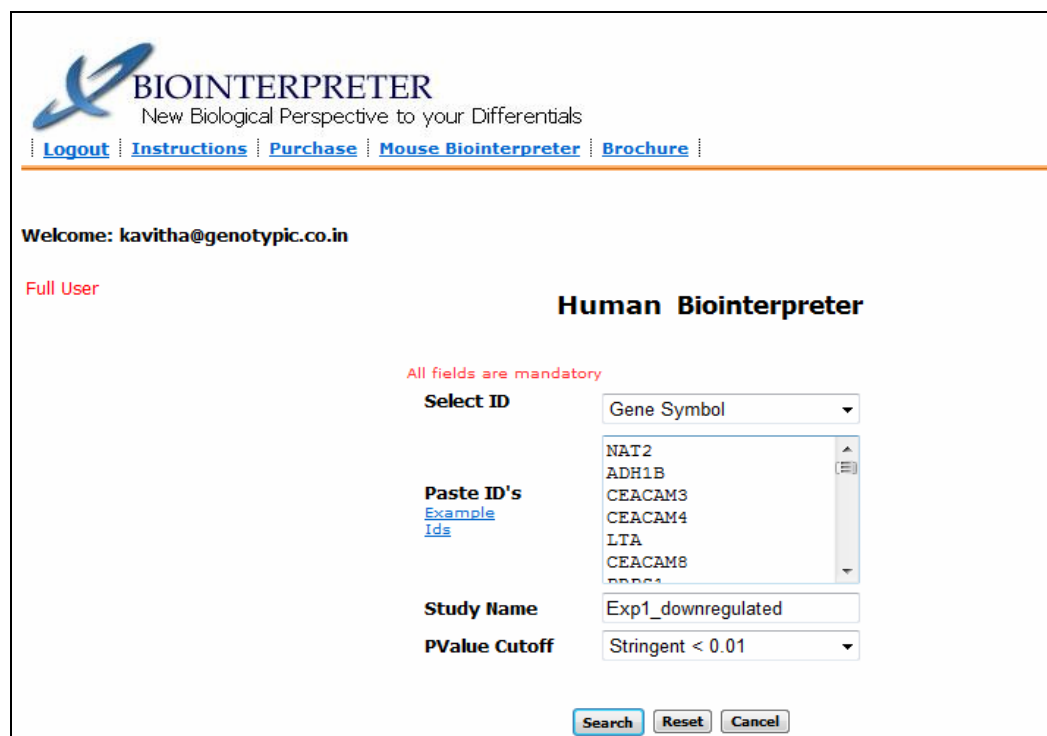
Paste ID's [Example Ids](#)

Study Name Exp1_upregulated

PValue Cutoff Stringent < 0.01

[Search](#) [Reset](#) [Cancel](#)

Example 2



BIOINTERPRETER
New Biological Perspective to your Differentials

[Logout](#) | [Instructions](#) | [Purchase](#) | [Mouse Biointerpreter](#) | [Brochure](#)

Welcome: kavitha@genotypic.co.in

Full User

Human Biointerpreter

All fields are mandatory

Select ID Gene Symbol

Paste ID's [Example Ids](#)

Study Name Exp1_downregulated

PValue Cutoff Stringent < 0.01

[Search](#) [Reset](#) [Cancel](#)

What do I get?

Summary Window

[Back](#)
[Comments](#)
Limit: 300 Ids

Study Name - Up_regulated_set2
ID type- Human SwissProt ID

[Export To Excel](#)
[New Search](#)
Pvalue Cutoff - 0.05

Ids Entered	19	Non-redundant Ids	19
Number of Genes Found	19	Ids not found	0

Pathway

Pathway	No of genes	P value
☒ Cell cycle[121]	2	1E-09
☒ Melanoma[75]	1	1E-09
☐ Chronic myeloid leukemia[84]	1	1E-09
☐ Glioma[70]	1	1E-09
☐ ABC transporters - General[46]	1	1E-09
☐ Antigen processing and presentation[82]	1	1E-09
☐ Axon guidance[135]	1	1E-09
☐ Hedgehog signaling pathway[59]	1	1E-09
☐ Jak-STAT signaling pathway[159]	1	1E-09
☐ Hematopoietic cell lineage[91]	1	1E-09
☐ Cytokine-cytokine receptor interaction[261]	1	0.0014

[Select All](#)
[Clear](#)
☐ And
 ☒ Or(Default)
 [TableView](#)
[Pie Chart](#)

Chromosome

Chromosome	No of genes	P value
☐ 1[2263]	4	1E-09
☐ 5[969]	1	1E-09
☐ 6[1173]	3	1E-09
☐ 19[1374]	4	1E-09
☐ 20[590]	1	1E-09
☐ 18[335]	1	0.006
☐ 17[1268]	2	0.0108

Result Window

[Back](#)
[Export To Excel](#)
[New Search](#)
[Instruction](#)

[Bottom of the table \(Detail Annotation\)](#)

Gene list for Selected Pathways

[Description](#) (Click on Unigene to view detail annotation of the gene)

Query id	Unigene ID	Gene Symbol	Gene Name	PathwayID	PathwayName
CCNE1_HUMAN	Hs.244723	CCNE1	Cyclin E1	hsa04110	Cell cycle;
CDKN1A_HUMAN	Hs.370771	CDKN1A	Cyclin-dependent kinase inhibitor 1A (p21, Cip1)	hsa04110 hsa05218	Cell cycle; Melanoma;

[Table View](#)

Biointerpreter Detailed Annotation

Description

	Detailed Annotation For- Hs.244723
Gene Name	Cyclin E1
Gene Symbol	CCNE1
SwissPort ID	CCNE1_HUMAN
Unigene ID	Hs.244723
Functional Annotation	Activation;Apoptosis;Cell Cycle;Cell Differentiation;Machinery;Gene Regulation;Inflammation;Metabolism
Genotypic Curation	Breast Cancer [2];Oncogenesis [1];Prognosis [1];Transcription Regulation [1];Transcription Proliferation [5];Cell Differentiation [1];Gene Expression Regulators [2];Inflammation [1];Lymphoma [1];Machinery [5]
Gene Expression Data	Stimulated response;Signal transduction;Growth response;Cell specific expression;Cell differentiation;Growth Factor Studies;Other Infection;Viral Infection

Summary Report

Summary report gives the following details:

- Study Name: The study name entered by the user in the previous page.
- ID type: The type of ID queried by the user.
- IDs Entered: Number of ids you have pasted in the “Paste ids” textbox
- Non-redundant Ids: If any id in the list is repeated, the redundancy will be removed. Only the unique list of ids will be taken to query the database.
- Number of genes found: Number of genes found in the database for the IDs entered
- Number of ids not found: Ids not found in the database.
- The table views can be exported to Excel sheet and can be saved in the computer.

[Back](#) [Comments](#) **Limit: 300 Ids**
Study Name - rr **ID type- Human Unigene Id**
[Export To Excel](#) [New Search](#) **Pvalue Cutoff - 1**

Ids entered: No. of IDs queried by the user	Ids Entered	300	Non-redundant Ids	220
No. of genes found in the database corresponding to gene identifiers queried	Number of Genes Found	204	Ids not found	16

Pathway

	Pathway	No of genes	P va
☐	Regulation of actin cytoskeleton[218]	4	1E-
☐	Cell adhesion molecules (CAMs)[138]	9	1E-
☐	Cell Communication[117]	3	1E-
☐	Type I diabetes mellitus[44]	4	1E-
☐	Cell cycle[121]	7	1E-

List of unique identifiers queried
 List of gene identifiers not found in the database

The user can view the list of genes found in the database by clicking “*Number of Genes Found*” button. It displays the genes found with symbols and gene name. Unigene in this page is linked to detailed annotation of the corresponding gene.

Queryid	GeneID	GeneSymbol	GeneName
Hs.534699	Hs.534699	SCEL	Sciellin
Hs.591996	Hs.591996	BBOX1	Butyrobetaine (gamma), 2-oxoglutarate dioxygenase (gamma-butyrobetaine hydroxylase) 1
Hs.386567	Hs.386567	GBP2	Guanylate binding protein 2, interferon-inducible
Hs.171695	Hs.171695	DUSP1	Dual specificity phosphatase 1
Hs.513617	Hs.513617	MMP2	Matrix metalloproteinase 2 (gelatinase A, 72kDa gelatinase, 72kDa type IV collagenase)
Hs.351306	Hs.351306	SLC16A4	Solute carrier family 16, member 4 (monocarboxylic acid transporter 5)
Hs.380277	Hs.380277	DAPK1	Death-associated protein kinase 1
Hs.151254	Hs.151254	KLK7	Kallikrein-related peptidase 7
Hs.204238	Hs.204238	LCN2	Lipocalin 2 (oncogene 24p3)

Result Categories

The biological interpretations of the genes by BioInterpreter were represented under multiple categories. The categories are:

- Function
- Disease
- Localization
- Protein Ligand
- Gene Ontology
- Pathway
- Mutation
- Hot molecules
- Chromosome
- Gene Expression
- Protein domain
- Tissue expression
- Drug response data
- Phenotype

Function: Significant molecular / biochemical functions associated with the genes queried. The list of functions was curated from annotation available in our database.

Disease: Major disease associated with the genes queried.

Localization: Major sub-cellular localization of the genes in the query list. These sub-cellular localizations were curated from the updated annotation available in our database.

Protein Ligand: A Ligand is a molecule which interacts with a protein, by specifically binding to it. A list of significant protein ligands found for the genes in the query list are presented in BioInterpreter. Protein Ligand data were retrieved from [KEGG Ligand database](#)

Gene Ontology: Describes gene products in terms of their associated biological processes, cellular components and molecular functions in a species-independent manner.

Pathway: Collection of manually drawn pathway maps representing molecular interactions and reaction networks for metabolism, human diseases, cellular processes etc. These pathway details were obtained from [KEGG PATHWAY](#).

Mutation: A mutation is a change in the DNA sequence of a gene. Mutations in the DNA sequence can alter the amino acid sequence of the protein encoded by the gene. The

table view describes list of significant genes corresponding to various kind of mutations in the query list.

Hot Molecules: Hot molecules have been categorized into:

- i) Multifunctional
- ii) Involved in many diseases
- iii) Expressed under various conditions
- iv) Expressed in various cancer types
- v) Toxicity marker
- vi) Breast cancer marker

The table view describes the list of analogous genes to these hot molecules.

Chromosome: A threadlike linear strand of DNA and associated proteins in the nucleus of eukaryotic cells that carries the genes and functions in the transmission of hereditary information. The table view describes the list of chromosome corresponding to the genes in the query.

Gene Expression: Biointerpreter finds the genes which are differentially regulated upon disease / experimental conditions.

Protein Domain: A compact structural domain that is found amongst diverse proteins is likely to fold independently within its structural environment. Significant protein domains with number of genes supporting the protein domain in the query list.

Tissue Expression: Describes list of the significant tissues in which the query genes expressed.

Drug Response: Describes Genes which are differentially regulated for the particular drug response condition.

Phenotype: The observable physical or biochemical characteristics of an organism, as determined by both genetic makeup and environmental influences. Describes significant genes involved in the phenotypic change.

Explanation of Results

Viewing the Result Categories & interpretation

Pathway

The user can view the Pathways related to queried genes in the pathway table. The detailed pathway table is displayed as below.

Biointerpreter finds the list of pathways with number of genes involved in the pathway in the query list and also the corresponding P value. Number within the square bracket [] specifies the number of genes in the pathway of the genome.

	Pathway	No of genes	P value
☐	Regulation of actin cytoskeleton[218]	4	1E-09
☐	Cell adhesion molecules (CAMs)[138]	9	1E-09
☐	Cell Communication[117]	3	1E-09
☐	Type 1 diabetes mellitus[44]	4	1E-09
☐	Cell cycle[121]	7	1E-09
☐	VEGF signaling pathway[76]	3	1E-09
☐	Complement and coagulation cascades [69]	3	1E-09
☐	Glyoxylate and dicarboxylate metabolism[14]	2	1E-09
☐	One carbon pool by folate[19]	2	1E-09
☐	Natural killer cell mediated cytotoxicity [133]	4	1E-09
☐	beta-Alanine metabolism[24]	2	1E-09
☐	Limonene and pinene degradation[29]	2	1E-09
☐	Butanoate metabolism[44]	4	1E-09
☐	Propanoate metabolism[32]	2	1E-09
☐	Glycerolipid metabolism[62]	3	1E-09
☐	Tryptophan metabolism[85]	3	1E-09
☐	Histidine metabolism[42]	2	1E-09
☐	Valine, leucine and isoleucine degradation[52]	4	1E-09

Pathway

No. of genes in the pathway

P-value by chi-square test

Select All

Clear

☐ And
 ☒ Or(Default)

TableView

Pie Chart

Logical query
AND -genes in all the selected pathway
OR-genes in any one of the selected pathway

Select table view to view genes in the selected pathway

Select pie-chart to view the Graphical representation of the selected pathways

The details:

1) Check box to select the pathways and then to view the genes associated with the pathways. User can select a pathway and view the genes associated with that particular pathway.

1. Pathway
2. P value is the short term for Probability value.
3. It tells us about the probability of getting significant result from your list when compared to population. Chi-square test has been used to calculate the P value. Chi-square is a common statistical method used to compare the observed data and expected data. Usually P value less than 0.05 considered as significant. Number of genes in a pathway in the query list is compared to the genes in the same pathway in the genome to generate the P-Value.
4. The entire contents in the current page can be exported to spread sheet. Save the file in the local computer.
5. User can view the genes associated with the pathway.

Select the interested pathway

Pathway

	Pathway	No of genes	P value
☒	Regulation of actin cytoskeleton[218]	4	1E-09
☐	Cell adhesion molecules (CAMs)[138]	9	1E-09
☒	Cell Communication[117]	3	1E-09
☐	Type I diabetes mellitus[44]	4	1E-09
☐	Cell cycle[121]	7	1E-09
☐	VEGF signaling pathway[76]	3	1E-09
☐	Complement and coagulation cascades [69]	3	1E-09
☐	Glyoxylate and dicarboxylate metabolism[14]	2	1E-09
☐	One carbon pool by folate[19]	2	1E-09
☐	Natural killer cell mediated cytotoxicity [133]	4	1E-09

Select pie-chart to view the Graphical representation of the selected pathways

Select table view to view the genes in the selected pathway

Select "AND" to view the genes which are present in all the selected Pathways Select "OR" to view the genes present in any of the selected pathway

Select All Clear ☐ And ☒ Or(Default) TableView Pie Chart

- a. Select the check box(es) of interested pathway(s)
- b. Select the "Table view" button at the right bottom

Biointerpreter allows you to find genes which are associated with all the selected pathways. **Refer the above fig.**

Here is how:

- Select the Pathways by clicking on the corresponding check boxes.
- Select the AND radio button at the left bottom of the page.
- Select the “Table view” button

The list of genes associated with pathway selected will be displayed below the pathway results with the following annotation:

- Query ID
- Unigene ID with link to detailed annotation
- Gene Name
- Gene symbol
- Pathway ID (KEGG ID) with link to KEGG website
- Pathway name

In the above figure, the user has selected **Regulation of actin cytoskeleton and cell communication**. We can get the genes which are involved in both the pathway by clicking on the table view. **(Refer the table given below)**

Query id	Unigene ID	Gene Symbol	Gene Name	PathwayID	PathwayName
LTA	Hs.36	LTA	Lymphotoxin alpha (TNF superfamily, member 1)	hsa04940 hsa04612	Type I diabetes mellitus; Antigen processing and presentation;
TAP2	Hs.502	TAP2	Transporter 2, ATP-binding cassette, sub-family B (MDR/TAP)	hsa04612	Antigen processing and presentation;

Unigene ID column is linked to detailed annotation for the gene. Biointerpreter has comprehensive, frequently updated annotation for the genes. Pathway ID is linked to corresponding pathway in KEGG database.

If you click on **hsa04612** it will go to corresponding pathway in the **KEGG database**.

Similarly, we can get the genes which are associated with any one of the selected pathways:

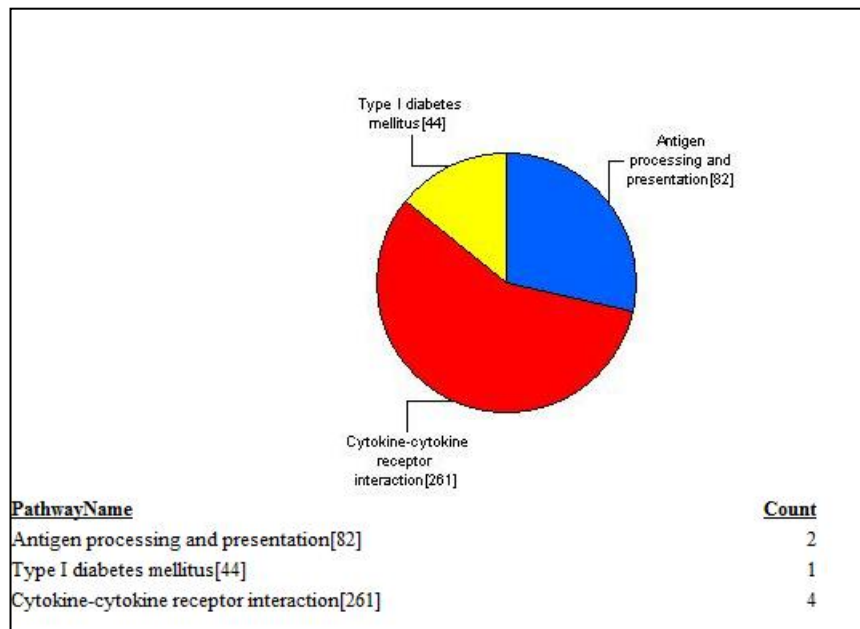
- i) Select the pathway by clicking on the corresponding check box.
- ii) Select the OR radio button at the bottom
- iii) Click the 'Table View' button.

Biointerpreter displays the genes which are associated with any one of the selected pathways **in the result window**.

To view the Pie Chart for the selected pathways:

- i) Select the pathways.
- ii) Click the 'Pie Chart' button.

Biointerpreter displays the pie chart **on result window**



Number in the square bracket [] shows the number of genes involved in the pathway in genome.

Function

	Function	No of genes	P value
☐	Activation[4856]	73	1E-09
☐	Ageing[379]	9	1E-09
☐	Angiogenesis[682]	22	1E-09
☐	Antigen Processing And Presentation[1554]	25	1E-09
☐	Apoptosis[2028]	33	1E-09
☐	Biosynthesis[1299]	13	1E-09
☐	Cell Adhesion[1915]	41	1E-09
☐	Cell Cycle[2387]	46	1E-09
☐	Cell Differentiation[1363]	17	1E-09
☐	Cell Division[1679]	32	1E-09
☐	Cell Migration[655]	16	1E-09

Biointerpreter finds list of functions that are over represented in query gene list. The details are

- Function
- Number of genes involved in the function in the query

The number in the square bracket [] specifies the number of genes involved in the functions in the genome.

To view the genes involved in a function:

- Select the Function by clicking the corresponding check box.
- Click the Table View button.

The list of genes associated with function selected will be displayed **at the result window** with the following information:

- Query ID
- Unigene ID with link to detailed annotation
- Gene Name
- Gene symbol
- Function

To view genes involved in all the selected functions:

- i) Select the Functions by clicking on the corresponding check boxes.
- ii) Select 'AND' radio button at the bottom.
- iii) Click the 'Table View' button.

	Function	No of genes	P value
☐	Activation[4856]	73	1E-09
☐	Ageing[379]	9	1E-09
☒	Angiogenesis[682]	22	1E-09
☒	Antigen Processing And Presentation[1554]	25	1E-09
☐	Apoptosis[2028]	33	1E-09
☐	Biosynthesis[1299]	13	1E-09
☐	Cell Adhesion[1915]	41	1E-09
☐	Cell Cycle[2387]	46	1E-09

In the above figure, the user would like to view the genes involved in both **Angiogenesis** and **Antigen Processing & Presentation**. Biointerpreter finds the genes involved in both of the functions and reports **in the result window**.

Gene list for Selected Significant Functions

[Description](#) (Click on Unigene to view detail annotation of the gene)

Query id	Unigene ID	Gene Symbol	Gene Name	Angiogenesis	Antigen Processing And Presentation
Hs.109225	Hs.109225	VCAM1	Vascular cell adhesion molecule 1	2	0
Hs.111779	Hs.111779	SPARC	Secreted protein, acidic, cysteine-rich (osteonectin)	6	1
Hs.112408	Hs.112408	S100A7	S100 calcium binding protein A7	4	0
Hs.118400	Hs.118400	FSCN1	Fascin homolog 1, actin-bundling protein (Strongylocentrotus purpuratus)	0	1
Hs.124649	Hs.124649	ABCG1	ATP-binding cassette, sub-family G (WHITE), member 1	0	9
Hs.128316	Hs.128316	BAIAP2	BAI1-associated protein 2	2	0
Hs.133397	Hs.133397	ITGA6	Integrin, alpha 6	2	1
Hs.136348	Hs.136348	POSTN	Periostin, osteoblast specific factor	5	0
Hs.138860	Hs.138860	ARHGAP1	Rho GTPase activating protein 1	2	0
Hs.143250	Hs.143250	TNC	Tenascin C (hexabrachion)	5	0
Hs.163867	Hs.163867	CD14	CD14 molecule	0	5
Hs.171695	Hs.171695	DUSP1	Dual specificity phosphatase 1	1	2

Number of related keywords of the function found in the comprehensive annotation of the gene is displayed under each function. This number is hyperlinked to get detailed annotation of the gene. Related keywords for the function will be highlighted in the detailed annotation.

For example, in the above figure,

2 related keywords of “**Angiogenesis**” were found in Hs.109225.

2 related keywords of “**Antigen processing and Presentation**” were found in Hs.111779.

If you click on Angiogenesis found in **Hs.109225** it will give you detailed annotation for Hs.109225.

	Detailed Annotation For- Hs.111
	Highlighted keywords-- Vegf;Endothelial Growth;Endothelial Cell Growth;Angiopoietin;Angiogenetic;Angiogenesis;Angiogen
Gene Name	Fibroblast growth factor 9 (glia-activating factor)
Gene Symbol	FGF9
SwissPort ID	FGF9_HUMAN
Unigene ID	Hs.111
Functional Annotation	Angiogenesis; Cell Cycle; Cell Differentiation; Cell Division; Cell Morphogenesis; Cell Proliferation; Gene Regulation; Growth Factors And Regulators; Immune Response; Infection; Neuronal;
Genotypic Curation	Transcription Regulation [1]; Transcription [4]; Vasculogenesis [1]; Cell Adhesion [4]; AIDS [1]; Apoptosis [1]; Cell Division [3]; Cell Migration [3]; Cell Proliferation [5]; Chromosomal Segregation [1]; Cell Differentiation [4]; Growth Factors And Regulators [5]; Neuronal [2]; Oncogenesis [1]; Post Translational Modifications [1]; Prostate Cancer [1]; Protein Sorting [1]; Receptors Ligand Mediation [2]; RNA Machinery [4]; Signal Transduction [1]
Gene Expression Data	Myopathy; Cell specific expression; Cancer specific; Tissue / Organ Specific Expression; Viral Infection; Cell Cycle;
Gene Summary	The protein encoded by this gene is a member of the fibroblast growth factor (FGF) family. FGF family members possess broad mitogenic and cell survival activities and are involved in a variety of biological processes including embryonic development cell growth morphogenesis tissue repair tumor growth and invasion. This protein was isolated as a secreted factor that exhibits a growth-stimulating effect on cultured glial cells. In nervous system this protein is produced mainly by neurons and may be important for glial cell development. Expression of the mouse homolog of this gene was found to be

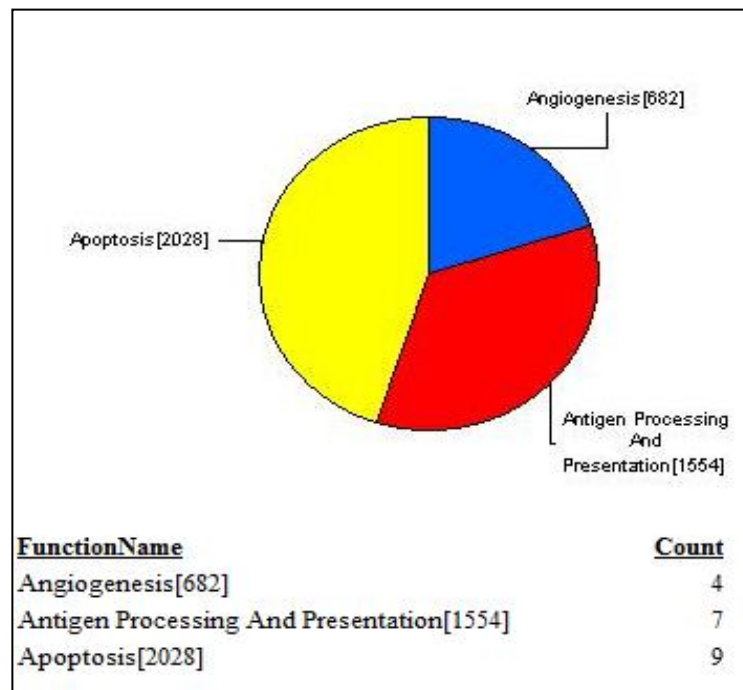
To view genes involved in any one of the selected functions:

- i) Select the Functions by clicking on the corresponding check boxes.
- ii) Select ‘OR’ radio button at the bottom.
- iii) Click the ‘Table View’ button.

List of genes involved in any one of the function will be displayed **at the result window**.

To view the pie chart for the selected functions:

- i) Select the Functions.
- ii) Click the 'Pie chart' button



Number in the square bracket [] shows the number of genes involved in the functions in the genome.

Gene Expression

	Expression Condition	Up	Down	Both	P value
☐	Immunomodulation[100]	1	1	0	0.0004
☐	Syndrome[99]	2	0	0	0.0004
☐	Toxin treatment[33]	1	0	0	0.0013
☐	Metabolism[40]	1	0	0	0.0041
☐	Cardio Vascular Disease[47]	1	0	0	0.0092
☐	Cancer Stages[107]	0	1	0	1
☐	Gene regulation[107]	1	0	0	1
☐	Apoptosis[83]	1	1	0	1E-09
☐	Cell Cycle[277]	4	4	0	1E-09
☐	Inflammation[250]	7	3	0	1E-09
☐	Leukemia[1716]	19	10	3	1E-09
☐	Stress[2843]	31	23	3	1E-09

Biointerpreter generates the gene expression results in the above format.

- i) Expression condition - Gene expression condition of the genes in various stages.
- ii) **Up** - Number of up regulated genes in the query list in the corresponding gene expression condition.
- iii) **Down** - Number of down regulated genes in the query list in the corresponding gene expression condition.
- iv) **Both** - Number of genes which are up and down regulated in the corresponding gene expression condition.
- v) **P value**
- vi) Number in the square bracket [] is the specified number of genes in the genome differentially regulated for the corresponding gene expression condition.

To view the genes which are differentially regulated for the particular gene expression condition

	Expression Condition	Up	Down	Both	P value
☐	Atherosclerosis[164]	1	0	0	0.0001
☐	Gene Activation response[1285]	3	0	0	0.0001
☐	Inflammation[250]	0	1	0	0.0015
☐	Cell Cycle[277]	0	1	0	0.0028
☐	Response to organic compounds[345]	0	1	0	0.009
☐	Myopathy[410]	1	0	0	0.0192
☐	Anti-oxidant treatment[447]	0	1	0	0.027
☐	Stress[2843]	4	0	1	1E-09
☐	Normal Vs Cancer[498]	9	11	0	1E-09
☐	Cancer Stages[107]	1	0	0	1E-09
☐	Primary Tumor Vs Metastasis[1847]	2	2	1	1E-09
☐	Other Diseases[74]	0	1	0	1E-09
☐	Cancer specific[1734]	2	2	0	1E-09
☐	Gene regulation[107]	1	0	0	1E-09

☐ And
 ☒ Or(Default)

- i) Select the gene expression condition.
- ii) Click on the Table View button.

List of genes which are differentially regulated in the selected gene expression conditions will be displayed in result window. Each gene is supported by the type of regulation with number of sub-conditions available for the particular gene expression condition.

Query id	Unigene ID	Gene Symbol	Gene Name	Immunomodulation	Syndrome	Toxin treatment	Metabolism
Hs.19192	Hs.19192	CDK2	Cyclin-dependent kinase 2	None	None	None	Up-1
Hs.204238	Hs.204238	LCN2	Lipocalin 2 (oncogene 24p3)	Down-1	None	None	None
Hs.2250	Hs.2250	LIF	Leukemia inhibitory factor (cholinergic differentiation factor)	None	None	Up-1	None
Hs.25647	Hs.25647	FOS	V-fos FBJ murine osteosarcoma viral oncogene homolog	Up-1	None	None	None

In the above figure, for Hs.19192 under **metabolism** condition the result is [Up-1](#). It specifies that Hs.19192 is up regulated in **metabolism**.

Note: 'None' indicates no data available for the gene under the particular gene expression condition.

To view the gene expression data in detail click on [Up-1](#) you will get the following gene expression details at the bottom of the page.

Unigene ID - Linked to Unigene

PMID - Article's Pubmed ID from which the data has been curated. PMID is linked to corresponding article in Pubmed.

Experiment - Experiment details.

Condition - Condition in which the genes are expressed.

Regulation - Type of regulation

UnigeneID	PMID	Experiment	Condition	Regulation
Hs.19192	11834723	HNF4alpha_metabolism	Genes up-regulated in human hepatoma cells by a liver-specific transcription factor ,Hepatocyte nuclear factor 4,HNF-4 alpha.	UP

To view the genes which are differentially regulated in all the gene expression conditions

- "Select all" the gene expression conditions.
- Select 'OR' radio button at the bottom.
- Click the 'Table View' button.

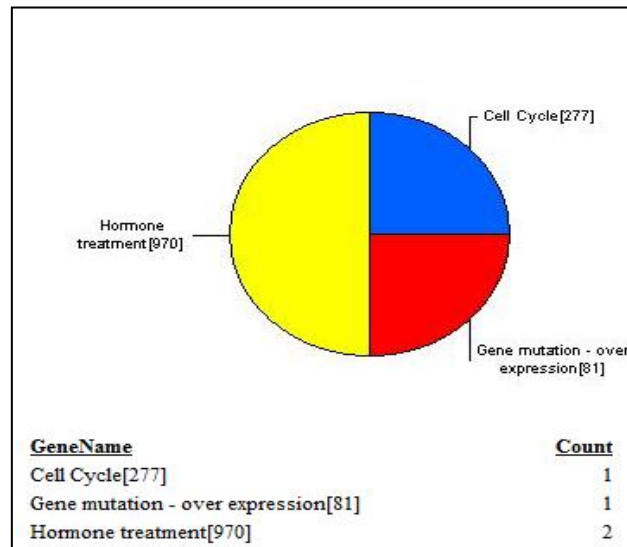
	Expression Condition	Up	Down	Both	P value
☒	Atherosclerosis[164]	1	0	0	0.0001
☒	Gene Activation response[1285]	3	0	0	0.0001
☒	Inflammation[250]	0	1	0	0.0015
☒	Cell Cycle[277]	0	1	0	0.0028
☒	Response to organic compounds[345]	0	1	0	0.009
☒	Myopathy[410]	1	0	0	0.0192
☒	Anti-oxidant treatment[447]	0	1	0	0.027
☒	Stress[2843]	4	0	1	1E-09
☒	Normal Vs Cancer[498]	9	11	0	1E-09
☒	Cancer Stages[107]	1	0	0	1E-09
☒	Primary Tumor Vs Metastasis[1847]	2	2	1	1E-09
☒	Other Diseases[74]	0	1	0	1E-09
☒	Cancer specific[1734]	2	2	0	1E-09
☒	Gene regulation[107]	1	0	0	1E-09

☐ And
 ☒ Or(Default)

Genes which are differentially regulated in all the selected gene expression conditions will be displayed **at the result window**.

To view the Pie Chart

- i) Select the gene expression conditions
- ii) Select the desired regulation type (Up / Down / Both) from the pull down menu at the bottom
- iii) Click the 'Pie Chart' button.



Number in the square bracket [] specifies number of genes in the genome differentially regulated for the corresponding gene expression condition.

Drug Response

	Drug	Up	Down	Both	P value
☐	Drug resistance[88]	1	1	0	0.0001
☐	Cancer drug resistance[203]	3	0	0	0.0004
☐	Response to Cancer Drugs[928]	7	13	9	1E-09
☐	Response to Other Drugs[1156]	10	16	0	1E-09
☐	Cancer drug treatment[1594]	21	8	7	1E-09
☐	Drug treatment[439]	7	1	2	1E-09

☐ And
 ☒ Or (Default)

Biointerpreter generates the drug response results in the above format.

- i) Drug - Type of drug treatment
- ii) Up - Number of up regulated genes in the query list in the corresponding drug response condition
- iii) Down - Number of down regulated genes in the query list in the corresponding drug response condition
- iv) Both - Number of genes which are up and down regulated in the corresponding drug response condition.
- v) P value

Number in the square bracket [] specifies number of genes in the database differentially regulated for the corresponding drug response condition.

To view the genes which are differentially regulated for the particular drug response condition

- Select the Drug response condition.
- Click on the Table View button.

	Drug	Up	Down	Both	P value
☐	Drug resistance[88]	1	1	0	0.0001
☐	Cancer drug resistance[203]	3	0	0	0.0004
☐	Response to Cancer Drugs[928]	7	13	9	1E-09
☒	Response to Other Drugs[1156]	10	16	0	1E-09
☒	Cancer drug treatment[1594]	21	8	7	1E-09
☐	Drug treatment[439]	7	1	2	1E-09

☐ And
 ☒ Or (Default)

List of genes which are differentially regulated in the selected drug response conditions will be displayed in the **result window**. Each gene is supported by the type of regulation with number of sub-conditions available for the particular gene expression condition.

Description (Click on Unigene to view detail annotation of the gene)

Query id	Unigene ID	Gene Symbol	Gene Name	Response to Other Drugs	Cancer drug treatment
Hs.108029	Hs.108029	SH3BGR1	SH3 domain binding glutamic acid-rich protein like	None	Down-1
Hs.111779	Hs.111779	SPARC	Secreted protein, acidic, cysteine-rich (osteonectin)	None	Down-2
Hs.124503	Hs.124503	TCF8	Transcription factor 8 (represses interleukin 2 expression)	Up-2	None
Hs.132902	Hs.132902	CAP2	CAP, adenylate cyclase-associated protein, 2 (yeast)	None	Up-1Down-1

In the above figure, for Hs.108029 under **Response to Cancer drugs** the result is [Down-1](#). It specifies that Hs.108029 is down regulated in Response to Cancer drugs. There is one sub-condition under Response to Cancer drugs in which the gene is down regulated.

Note: 'None' indicates no data available for the gene under the drug response condition.

To view the sub-conditions, Click on the [Down-1](#) .You will get the following gene expression details at the bottom of the page.

Unigene ID - Linked to Unigene

PMID - article's Pubmed ID from which the data has been curated.
PMID is linked to corresponding article in Pubmed.

Experiment - Experiment details

Condition - Condition in which the genes are expressed

Regulation - Type of regulation

UnigeneID	PMID	Experiment	Condition	Regulation
Hs.108029	15831674	"Letrozole, Anastrozole and Tamoxifen treatment response"	"Down -Regulated Genes in Human Mammary Carcinoma cells, MCF-7aro Cells,MCF-7 cells stably transfected with the aromatase gene by Testosterone, 17 β -estradiol , inhibitors (letrozole and anastrozole), and an antiestrogen (tamoxifen)."	DOWN

Biointerpreter provides a way to view all the drug response details for a gene. To view all the gene expression details of a gene click on the links in the Unigene ID in the above table. All gene expression data available for the gene will be presented with the following information.

Unigene ID- Linked to Unigene

PMID - linked to Pubmed

Experiment - Condition summary

Condition - Experimental condition

Regulation-Type of regulation

Major classification - Type of drug treatment.

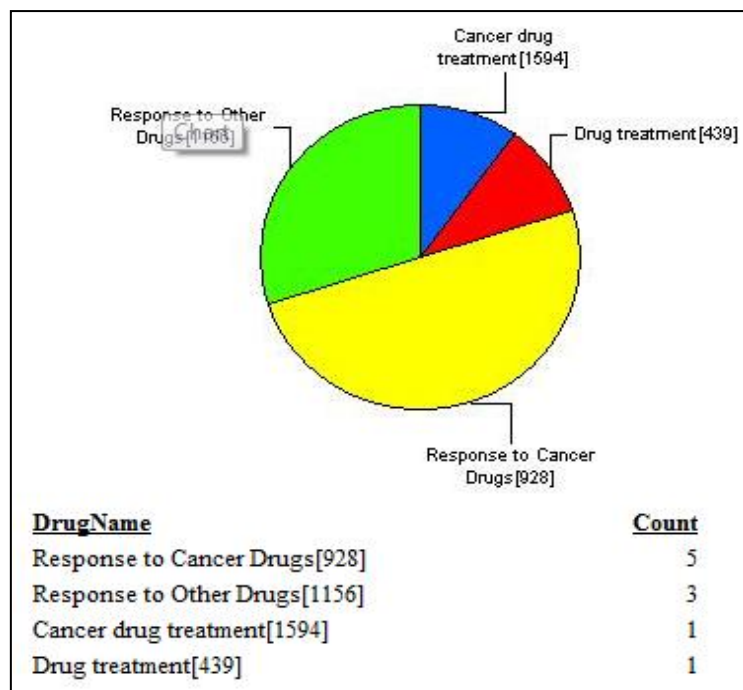
To view the genes which are differentially regulated in all the selected drug response conditions:

- i) Select the drug response conditions.
- ii) Select 'AND' radio button at the bottom.
- iii) Click the 'Table View' button.

Genes which are differentially regulated in all the selected drug response conditions will be displayed **at the result window**.

To view the Pie Chart

- I. Select the drug response conditions
- II. Select the desired regulation type (Up / Down / Both) from the pull down menu at the bottom
- III. Click the 'Pie Chart' button.



Number in the square bracket [] specifies number of genes in the genome differentially regulated for the corresponding drug response condition.

Hot Molecules

Hot molecules have been categorized into:

- i) Multifunctional genes - genes involved in more than 10 functions
- ii) Involved in many diseases - Genes involved in more than 8 diseases
- iii) Expressed under various conditions - Genes differentially regulated in more than 8 gene expression conditions
- iv) Expressed in various cancer types - Genes differentially regulated in more than 8 cancer types
- v) Breast cancer marker

	category	No of genes
☐	Toxicity Marker[116]	4
☐	Breast cancer Marker[161]	8
☐	Expressed in various cancer types[780]	20
☐	Involved in Many Diseases[4106]	40
☐	Expressed under various conditions[2473]	84
☐	Multi-functional genes[17053]	92
Select All Clear TableView Pie Chart		

Biointerpreter generates the hot molecule results in the above format. Number in the square bracket [] specifies number of genes in the database for the corresponding hot molecule category.

To view the gene list in the hot molecule category

- i) Select the hot molecule category
- ii) Click on the “Table view” button

The list of genes associated with hot molecule category selected will be displayed **at the result window** with the following information:

- Query ID
- Unigene ID with link to detailed annotation
- Gene Name
- Gene symbol
- List of functions under “Multifunctional gene”
- List of Gene expression conditions under “Expressed under various conditions”
- List of cancer types under “Expressed under various cancer types”

Query id	Unigene ID	Gene Symbol	Gene Name	Expressed in various cancer types	Expressed under various conditions	Multi-functional genes
Hs.69855	Hs.69855	CSDE1	Cold shock domain containing E1, RNA-binding	Bone Tumour, Brain Tumour, Cervix Tumour, Colon Tumour, Eye Tumour, Germ cell Tumour, Liver Tumour, Lung Tumour, Lymph Tumour, Muscle Tumour, Ovary Tumour, Placenta Tumour, Skin Tumour, Testis Tumour, Uterus Tumour		
Hs.524947	Hs.524947	CDC20	Cell division cycle 20 homolog (S. cerevisiae)		Leukaemia, Stress, Normal Vs Cancer, Cancer Stages, Response to organic compounds, Anti-oxidant treatment, Atherosclerosis, Cell specific expression, Gene Activation response, Growth factor treatment, Signal transduction, Stimulated response	Activation, Cell Cycle, Cell Division, Cell Proliferation, Dna Machinery, Dna Repair, Drug Response, Gene Regulation, Immune Response, Infection, Metabolism
Hs.397609	Hs.397609	RPS16	Ribosomal protein S16		Cell Cycle, Stress, Normal Vs Cancer, Primary Tumor Vs Metastasis, Viral Infection, Cell specific expression	

Chromosome

Chromosome			
	Chromosome	No of genes	P value
☐	1[2263]	19	1E-09
☐	5[969]	10	1E-09
☐	6[1173]	8	1E-09
☐	14[683]	9	1E-09
☐	21[296]	2	1E-09
☐	X[906]	6	1E-09
☐	2[1481]	11	0.0001
☐	11[1368]	10	0.0002
☐	10[892]	7	0.0009
☐	12[1128]	8	0.0013
☐	18[335]	3	0.0151
☐	22[530]	4	0.0162
☐	20[590]	4	0.0309

☐ And
 ☒ Or(Default)

Biointerpreter generates the list of the chromosomes for the genes in your query.

- i) Chromosome
- ii) Number of genes present in the chromosome in the query list
- iii) P value

The number in the square bracket [] specifies the number of genes present in the chromosome.

To view the genes present in a Chromosome:

- i) Select the Chromosome by clicking the corresponding check box.
- ii) Click the Table View button.

Chromosome

	Chromosome	No of genes	P value
☐	1[2263]	19	1E-09
☐	5[969]	10	1E-09
☐	6[1173]	8	1E-09
☐	14[683]	9	1E-09
☐	21[296]	2	1E-09
☒	X[906]	6	1E-09
☐	2[1481]	11	0.0001
☐	11[1368]	10	0.0002
☐	10[892]	7	0.0009
☐	12[1128]	8	0.0013
☐	18[335]	3	0.0151
☐	22[530]	4	0.0162
☐	20[590]	4	0.0309
☐	3[1211]	4	1
☒	4[883]	5	1

☐ And
 ☒ Or(Default)

In the above figure, the user would like to view the genes present in **Chromosome 4 and X**. Biointerpreter finds the genes present in the chromosome 4 and X and reports **in the result window**.

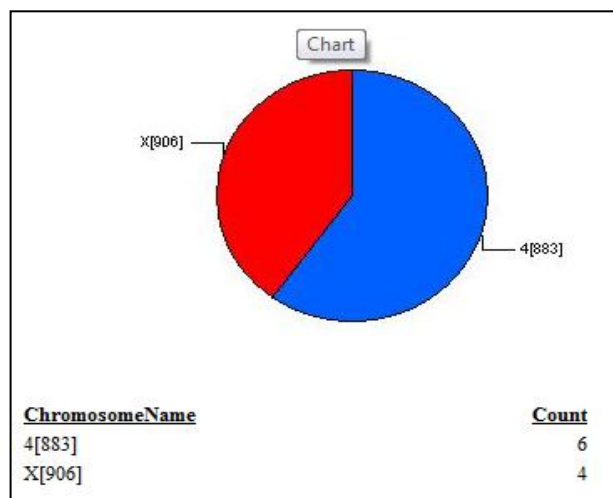
The list of genes present in the selected chromosome will be displayed **at the result window** with the following information:

- Query ID
- Unigene ID with link to detailed annotation
- Gene Name
- Gene symbol
- Chromosome
- Cytoband

Query id	Unigene ID	Gene Symbol	Gene Name	Chromosome	Cytoband
Hs.108029	Hs.108029	SH3BGR1	SH3 domain binding glutamic acid-rich protein like	X	Xq13.3
Hs.195464	Hs.195464	FLNA	Filamin A, alpha (actin binding protein 280)	X	Xq28
Hs.200716	Hs.200716	MECP2	Methyl CpG binding protein 2 (Rett syndrome)	X	Xq28
Hs.27695	Hs.27695	MID1	Midline 1 (Opitz/BBB syndrome)	X	Xp22
Hs.29595	Hs.29595	PRAF2	PRA1 domain family, member 2	X	Xp11.23
Hs.2962	Hs.2962	S100P	S100 calcium binding protein P	4	4p16
Hs.302963	Hs.302963	SPON2	Spondin 2, extracellular	4	4p16.3

To view the pie chart for the selected Chromosome:

- Select the Chromosome.
- Click the 'Pie chart' button.



Biointerpreter displays the pie chart in the result window.

Diseases

Diseases

	Disease	No of genes	P value
☐	Aids[1369]	30	1E-09
☐	Anal Cancer[487]	17	1E-09
☐	Anthrax[8]	1	1E-09
☐	Arthritis[326]	9	1E-09
☐	Aspergillosis[18]	1	1E-09
☐	Asthma[185]	4	1E-09
☐	Bladder Cancer[179]	5	1E-09
☐	Breast Cancer[923]	27	1E-09
☐	Cervical Cancer[106]	8	1E-09
☐	Chronic Obstructive Pulmonary Disease[80]	2	1E-09
☐	Cockayne Syndrome[12]	1	1E-09
☐	Colon Cancer[654]	14	1E-09

☐ And

☒ Or(Default)

Biointerpreter finds list of the significant disease for the query list in the above format.

- i) Disease
- ii) Number of genes involved in the function in the query list
- iii) P value

The number in the square bracket [] specifies the number of genes involved in the disease in the genome.

To view the genes involved in a disease:

- i) Select the Disease by clicking the corresponding check box.
- ii) Click the Table View button.

Biointerpreter will display the genes involved in the particular disease **in the result window** with the following information.

- Query ID
- Unigene ID with link to detailed annotation
- Gene Name

- Gene symbol
- List of possible diseases

To view genes involved in all the selected Diseases:

- Select the disease by clicking on the corresponding check boxes.
- Select 'AND' radio button at the bottom.
- Click the 'Table View' button.

Diseases

	Disease	No of genes	P value
☐	Aids[1369]	30	1E-09
☐	Anal Cancer[487]	17	1E-09
☐	Anthrax[8]	1	1E-09
☐	Arthritis[326]	9	1E-09
☐	Aspergillosis[18]	1	1E-09
☐	Asthma[185]	4	1E-09
☒	Bladder Cancer[179]	5	1E-09
☒	Breast Cancer[923]	27	1E-09

☐ And
 ☒ Or(Default)

In the above figure, the user would like to view the genes involved in **Bladder cancer/breast cancer**. Biointerpreter finds the genes involved in both of the disease and reports **in the result window**.

Query id	Unigene ID	Gene Symbol	Gene Name	Bladder Cancer	Breast Cancer
Hs.109225	Hs.109225	VCAM1	Vascular cell adhesion molecule 1	0	1
Hs.111779	Hs.111779	SPARC	Secreted protein, acidic, cysteine-rich (osteonectin)	0	2
Hs.112408	Hs.112408	S100A7	S100 calcium binding protein A7	0	2
Hs.118400	Hs.118400	FSCN1	Fascin homolog 1, actin-bundling protein (Strongylocentrotus purpuratus)	0	3
Hs.120759	Hs.120759	APOB	Apolipoprotein B (including Ag(x) antigen)	1	0
Hs.133397	Hs.133397	ITGA6	Integrin, alpha 6	0	1
Hs.136348	Hs.136348	POSTN	Periostin, osteoblast specific factor	1	1
Hs.139389	Hs.139389	CST6	Cystatin E/M	0	3
Hs.143250	Hs.143250	TNC	Tenascin C (hexabrachion)	0	2
Hs.155017	Hs.155017	NRIP1	Nuclear receptor interacting protein 1	0	1

Number of related keywords found in the comprehensive annotation of the gene is displayed under each disease. This number is hyperlinked to get detailed annotation of the gene. Related keywords for the disease will be highlighted in the detailed annotation.

For example, in the above figure,

2 related keywords of “breast cancer” were found in Hs.111779.

1 related keywords of “bladder cancer” were found in Hs.120759.

To view genes involved in any one of the selected disease:

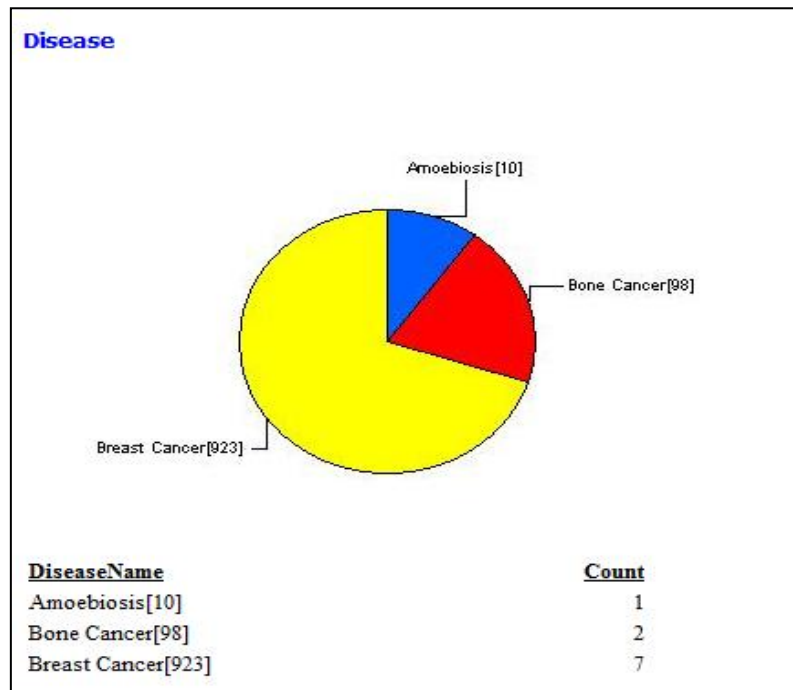
- Select the Diseases by clicking on the corresponding check boxes.
- Select ‘OR’ radio button at the bottom.
- Click the ‘Table View’ button.

List of genes involved in any one of the diseases will be displayed **in the result window**.

To view the pie chart for the selected disease:

- ii) Select the Diseases.
- iii) Click the 'Pie chart' button.

Biointerpreter displays the pie chart **in the result window**.



Number in the square bracket [] shows the number of genes involved in the disease in the genome.

Cellular Localization

Cellular Localization

	Localization	No of genes	P value
☐	Cytoplasm[3802]	40	1E-09
☐	Cytoskeleton[767]	9	1E-09
☐	Endoplasmic Reticulum[754]	9	1E-09
☐	Extracellular[1332]	28	1E-09
☐	Nucleus[4985]	51	1E-09
☐	Plasma Membrane[2092]	28	1E-09
☐	Secreted[1397]	27	1E-09
☐	Lysosomes[228]	3	0.001
☐	Centrosome[130]	2	0.0028
☐	Golgi Apparatus[761]	4	1
☐	Integral to membrane[3451]	19	1

☐ And
 ☒ Or(Default)

Biointerpreter finds list of the significant sub-cellular localization of the gene products in the query list.

- Sub cellular localization
- Number of gene(s) localized in the sub-cellular location
- P value

The number in the square bracket [] specifies the number of genes which belongs to the particular sub-cellular location in the genome.

To view the genes localized in the sub-cellular location:

- Select the Sub cellular Localization by clicking the corresponding check box.
- Click the Table View button.

Biointerpreter will display the genes localized in the particular sub-cellular localization in the result window with the following information.

- Query ID
- Unigene ID with link to detailed annotation
- Gene Name
- Gene symbol
- All possible Sub cellular locations

To view genes localized in all the selected sub-cellular location:

- i) Select the sub-cellular localization by clicking on the corresponding check boxes.
- ii) Select 'AND' radio button at the bottom.
- iii) Click the 'Table View' button.

Cellular Localization

	Localization	No of genes	P value
☒	Cytoplasm[3802]	40	1E-09
☐	Cytoskeleton[767]	9	1E-09
☐	Endoplasmic Reticulum[754]	9	1E-09
☐	Extracellular[1332]	28	1E-09
☐	Nucleus[4985]	51	1E-09
☐	Plasma Membrane[2092]	28	1E-09
☐	Secreted[1397]	27	1E-09
☐	Lysosomes[228]	3	0.001
☐	Centrosome[130]	2	0.0028
☐	Golgi Apparatus[761]	4	1
☒	Integral to membrane[3451]	19	1

☐ And
 ☒ Or(Default)

In the above figure, the user would like to view the genes localized in both **Cytoplasm** and **Integral to membrane**. Biointerpreter finds the genes localized in both the cytoplasm and integral to membrane and report **in the result window**.

Query id	Unigene ID	Gene Symbol	Gene Name	Cytoplasm	Integral to membrane
Hs.108029	Hs.108029	SH3BGRL	SH3 domain binding glutamic acid-rich protein like	<u>2</u>	0
Hs.109225	Hs.109225	VCAM1	Vascular cell adhesion molecule 1	0	<u>1</u>
Hs.110364	Hs.110364	PPIC	Peptidylprolyl isomerase C (cyclophilin C)	<u>3</u>	0
Hs.112408	Hs.112408	S100A7	S100 calcium binding protein A7	<u>5</u>	0
Hs.128316	Hs.128316	BAIAP2	BAI1-associated protein 2	<u>4</u>	0

Number of related keywords found in the comprehensive annotation of the gene is displayed under Cytoplasm and integral to membrane. This number is hyperlinked to get detailed annotation of the gene. Related keywords for the Cytoplasm and integral to membrane will be highlighted in the detailed annotation.

For example, in the above figure,

2 related keywords of “Cytoplasm” were found in Hs.108029.

1 related keywords of “Integral to membrane” were found in Hs.109225.

To view genes localized in any one of the selected sub-cellular location:

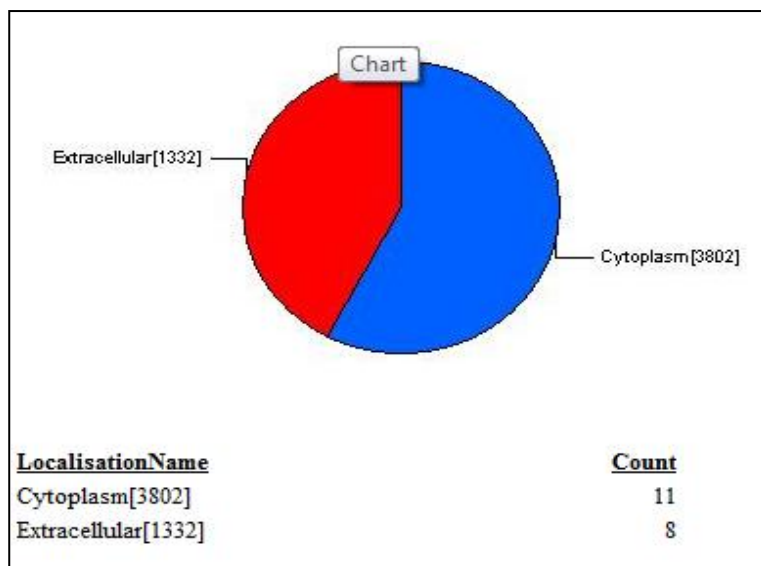
- i) Select the sub-cellular localization by clicking on the corresponding check boxes.
- ii) Select ‘OR’ radio button at the bottom.
- iii) Click the ‘Table View’ button.

List of genes localized in any one of the sub-cellular localization will be displayed **at result window**.

To view the pie chart for the selected sub-cellular localization:

- i) Select the sub-cellular localization.
- ii) Click the ‘Pie chart’ button.

Biointerpreter displays the pie chart **at the right hand page**



The number in the square bracket [] specifies the number of genes localized in the sub-cellular localization in the genome.

Tissue Expression

	Tissue	No of genes	P value
☐	Bladder[8327]	88	1E-09
☐	Blood[14779]	107	1E-09
☐	Bone[16941]	126	1E-09
☐	Bone Marrow[9761]	97	1E-09
☐	Brain[31102]	140	1E-09
☐	Cervix[9340]	90	1E-09
☐	Colon[18606]	135	1E-09
☐	Embryo[16524]	120	1E-09

☐ And
 ☒ Or(Default)

Biointerpreter finds list of the significant tissues in which the query genes expressed in the above format.

- i) Tissue
- ii) Number of gene(s) expressed in the tissue
- iii) P value

The number in the square bracket [] specifies the number of genes expressed in the tissue in the genome.

To view the genes expressed in the tissue location:

- i) Select the Tissue by clicking the corresponding check box.
- ii) Click the Table View button.

	Tissue	No of genes	P value
☒	Bladder[8327]	88	1E-09
☒	Blood[14779]	107	1E-09
☐	Bone[16941]	126	1E-09
☐	Bone Marrow[9761]	97	1E-09
☐	Brain[31102]	140	1E-09
☐	Cervix[9340]	90	1E-09

☐ And
 ☒ Or(Default)

Biointerpreter will display the genes expressed in the particular tissue **at result window** with the following information.

- Query ID
- Unigene ID with link to detailed annotation
- Gene Name
- Gene symbol
- All possible tissues

To view genes localized in all the selected Tissue:

- Select the tissue by clicking on the corresponding check boxes.
- Select 'AND' radio button at the bottom.
- Click the 'Table View' button.

Query id	Unigene ID	Gene Symbol	Gene Name	Bladder	Blood
Hs.108029	Hs.108029	SH3BGR1	SH3 domain binding glutamic acid-rich protein like	<u>1</u>	<u>1</u>
Hs.109225	Hs.109225	VCAM1	Vascular cell adhesion molecule 1	<u>1</u>	<u>1</u>
Hs.110364	Hs.110364	PPIC	Peptidylprolyl isomerase C (cyclophilin C)	<u>1</u>	0
Hs.111779	Hs.111779	SPARC	Secreted protein, acidic, cysteine-rich (osteonectin)	<u>1</u>	<u>1</u>
Hs.11590	Hs.11590	CTSF	Cathepsin F	<u>1</u>	0
Hs.118400	Hs.118400	FSCN1	Fascin homolog 1, actin-bundling protein (Strongylocentrotus purpuratus)	<u>1</u>	<u>1</u>
Hs.120759	Hs.120759	APOB	Apolipoprotein B (including Ag(x) antigen)	0	<u>1</u>
Hs.124503	Hs.124503	TCF8	Transcription factor 8 (represses interleukin 2 expression)	0	<u>1</u>
Hs.124649	Hs.124649	ABCG1	ATP-binding cassette, sub-family G (WHITE), member 1	0	<u>1</u>

Number of related keywords found in the comprehensive annotation of the gene is displayed under each tissue. This number is hyperlinked to get detailed annotation of the gene. Related keywords for the tissue will be highlighted in the detailed annotation.

For example, in the above figure,

1 related keyword of “**Blood**” was found in Hs.108029.

1 related keyword of “**Bladder**” was found in Hs.109225.

To view genes expressed in any one of the selected tissue:

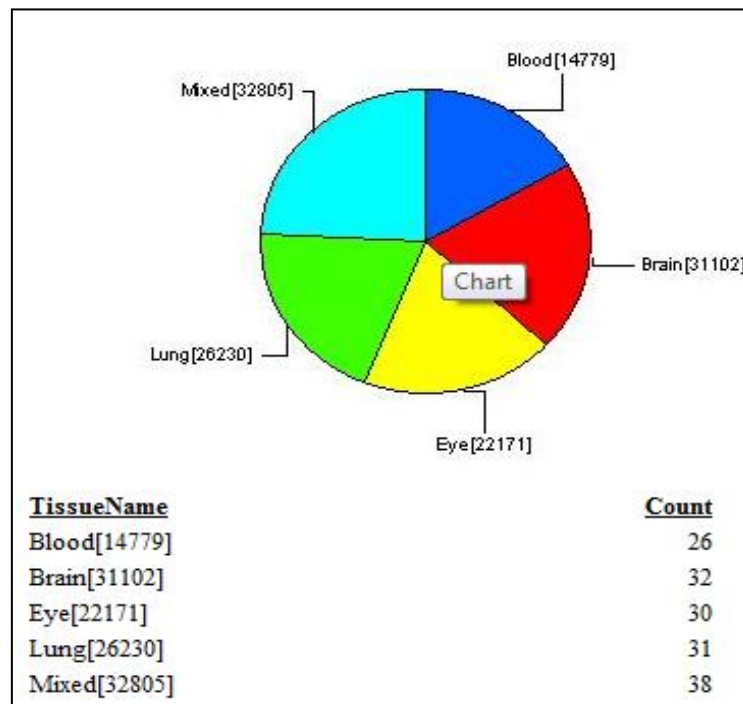
- i) Select the tissue by clicking on the corresponding check boxes.
- ii) Select 'OR' radio button at the bottom.
- iii) Click the 'Table View' button.

List of genes expressed in any one of the tissue will be displayed **in the result window**.

To view the pie chart for the selected Tissue:

- i) Select the tissue.
- ii) Click the 'Pie chart' button.

Biointerpreter displays the pie chart **in the result window**.



The number in the square bracket [] specifies the number of genes expressed in the tissue in genome.

Cancer Gene Expression

Cancer Gene Expression

	Cancer Type	Up	Down	Both	P value
☐	Brain Tumor[1859]	22	3	1	1
☐	Eye Tumor[784]	6	4	0	1
☐	Germcell Tumor[905]	4	3	0	1
☐	Adrenal Tumor[20]	0	1	0	1E-09
☐	Blood Tumor[253]	3	1	0	1E-09
☐	Bone Tumor[190]	3	1	0	1E-09
☐	Breast Tumor[61]	1	1	0	1E-09
☐	Colon Tumor[1033]	16	2	1	1E-09
☐	Head&Neck Tumor[205]	0	4	0	1E-09
☐	Kidney Tumor[30]	2	0	0	1E-09

☐ And
 ☒ Or(Default)

Biointerpreter generates the cancer gene expression output shown in the above format.

To view the genes differentially regulated in the cancer types

- Select the cancer types
- Select 'AND' radio button at the bottom.
- Click the 'Table View' button

	Cancer Type	Up	Down	Both	P value
☐	Brain Tumor[1859]	22	3	1	1
☐	Eye Tumor[784]	6	4	0	1
☐	Germcell Tumor[905]	4	3	0	1
☐	Adrenal Tumor[20]	0	1	0	1E-09
☒	Blood Tumor[253]	3	1	0	1E-09
☒	Bone Tumor[190]	3	1	0	1E-09

☐ And
 ☒ Or(Default)

Gene list for Selected Cancer Gene Expression

[Description](#) (Click on Unigene to view detail annotation of the gene)

Query id	Unigene ID	Gene Symbol	Gene Name	Blood Tumor	Bone Tumor
Hs.171695	Hs.171695	DUSP1	Dual specificity phosphatase 1	Up	-
Hs.1908	Hs.1908	PRG1	Proteoglycan 1, secretory granule	Up	Up
Hs.195464	Hs.195464	FLNA	Filamin A, alpha (actin binding protein 280)	Up	-
Hs.250899	Hs.250899	HSBP1	Heat shock factor binding protein 1	Down	Down
Hs.25155	Hs.25155	NET1	Neuroepithelial cell transforming gene 1	-	Up
Hs.282997	Hs.282997	GBA	Glucosidase, beta; acid (includes glucosylceramidase)	-	Up

List of genes which are differentially regulated in the selected cancer type will be displayed **in result window**. The type of regulation (Up or down) for the gene under the specific cancer type will be given.

In the above figure, for Hs.171695 under **Blood tumor** the result is **Up**

It specifies **Hs.171695** is up regulated in blood tumor.

Note: '-' indicates no data available for the gene under the cancer type.

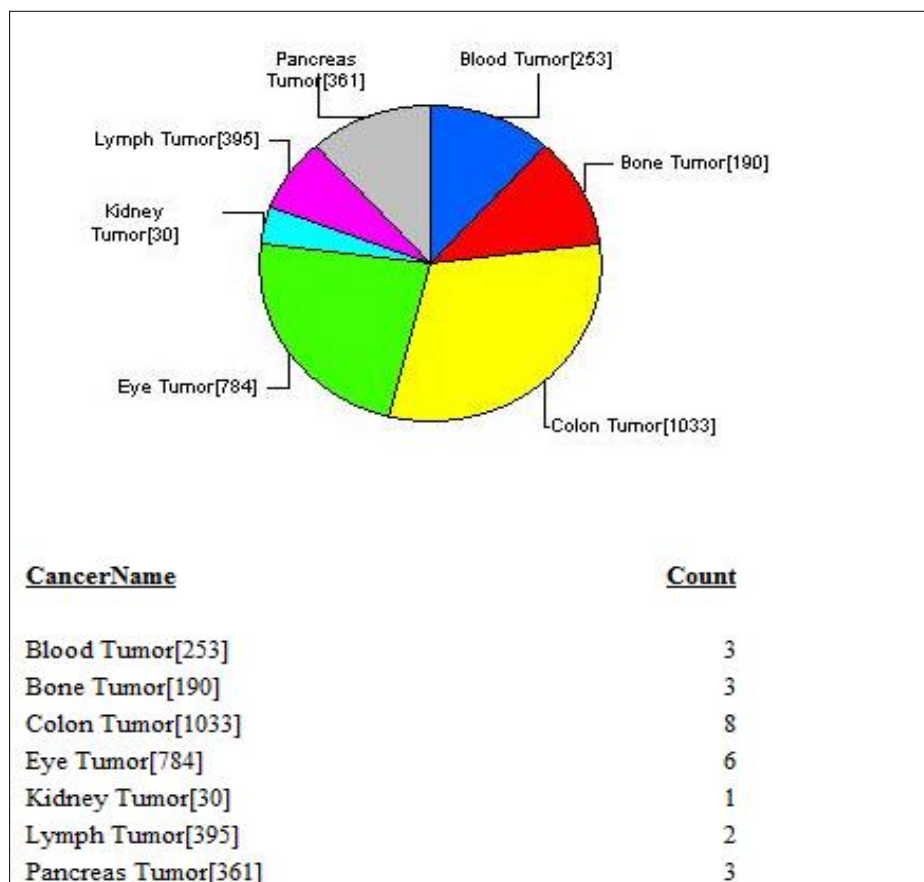
To view the genes which are differentially regulated in all the selected cancer types

- Select the cancer types.
- Select 'AND' radio button at the bottom.
- Click the 'Table View' button.

Genes which are differentially regulated in all the selected cancer types will be displayed **in the result window**.

To view the Pie Chart

- iv) Select the cancer types
- v) Select the desired regulation type (Up / Down / Both) from the pull down menu at the bottom
- vi) Click the 'Pie Chart' button.



Number in the square bracket [] specifies number of genes in the genome differentially regulated for the corresponding cancer type.

Gene Ontology

Gene Ontology

	Gene Ontology	No of genes	P value
☐	nucleus (C)[4119]	48	1E-09
☐	cytoplasm (C)[1660]	26	1E-09
☐	SH3/SH2 adaptor activity (F)[53]	3	1E-09
☐	protein binding (F)[4116]	52	1E-09
☐	plasma membrane (C)[682]	9	1E-09
☐	cell-cell adhesion (P)[47]	3	1E-09
☐	unfolded protein binding (F)[115]	3	1E-09
☐	extracellular region (C)[667]	9	1E-09
☐	basement membrane (C)[38]	4	1E-09
☐	copper ion binding (F)[57]	2	1E-09
☐	collagen binding (F)[21]	2	1E-09

☐ And
 ☒ Or(Default)

Biointerpreter gives you list of significant Gene ontology with number of genes supporting the Gene ontology in the query list. Number within the square bracket [] with Gene ontology specifies the number of genes supporting the Gene ontology in the genome.

To view the genes involved in the particular Gene ontology:

- ii) Select the Gene ontology by clicking on the corresponding check box.
- iii) Click the Table View button.

The list of genes associated with selected gene ontology will be displayed at result window with the following information:

- Query ID
- Unigene ID with link to detailed annotation
- Gene Name
- Gene symbol
- Gene Ontology ID (GO ID) with link to Gene Ontology database.
- Gene ontology Name.

Biointerpreter allows you to find genes which are associated with all the selected Gene ontology.

Here is how:

- Select the Gene ontology by clicking on the corresponding check boxes.
- Select the AND radio button.
- Click the 'Table View' button.

Gene Ontology

	Gene Ontology	No of genes	P value
☒	nucleus (C)[4119]	48	1E-09
☒	cytoplasm (C)[1660]	26	1E-09
☐	SH3/SH2 adaptor activity (F)[53]	3	1E-09
☐	protein binding (F)[4116]	52	1E-09
☐	plasma membrane (C)[682]	9	1E-09
☐	cell-cell adhesion (P)[47]	3	1E-09
☐	unfolded protein binding (F)[115]	3	1E-09
☐	extracellular region (C)[667]	9	1E-09

☐ And
 ☒ Or(Default)

In the above figure, the user has selected **nucleus** and **cytoplasm**. We can get the genes which are involved in both the Gene ontology by clicking on the table view. (Refer the table given below)

Query id	Unigene ID	Gene Symbol	Gene Name	GeneOntologyID	GeneOntologyName
Hs.108029	Hs.108029	SH3BGRL	SH3 domain binding glutamic acid-rich protein like	GO:0005737 GO:0005634	cytoplasm (C); nucleus (C);
Hs.110364	Hs.110364	PPIC	Peptidylprolyl isomerase C (cyclophilin C)	GO:0005737	cytoplasm (C);
Hs.112408	Hs.112408	S100A7	S100 calcium binding protein A7	GO:0005634 GO:0005737	nucleus (C); cytoplasm (C);
Hs.124503	Hs.124503	TCF8	Transcription factor 8 (represses interleukin 2 expression)	GO:0005634	nucleus (C);
Hs.125962	Hs.125962	TFEC	Transcription factor EC	GO:0005634	nucleus (C);

Link in the Unigene ID column will lead the **detailed annotation** for the gene. Biointerpreter has comprehensive, frequently updated annotation for the genes. Gene Ontology ID is linked to corresponding gene ontology in Gene ontology website.

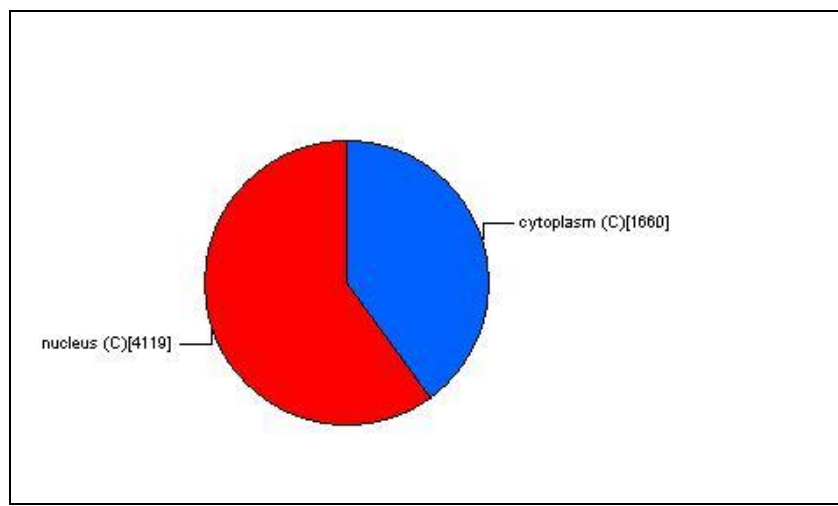
Similarly, we can get the genes which are associated with any one of the selected pathways:

- a) Select the Gene ontology by clicking on the corresponding check box.
- b) Select the OR radio button at the bottom
- c) Click the 'Table View' button.

Biointerpreter displays the genes which are associated with any one of the selected gene ontology, on result window.

To view the Pie Chart for the selected pathways:

- iii) Select the Gene Ontology.
 - iv) Click the 'Pie Chart' button.
- Biointerpreter displays the pie chart on result window.



Protein Domain

	Domain	No of genes	P value
☐	Immunoglobulin C-2 Type[153]	3	1E-09
☐	Kazal type serine protease inhibitors [37]	2	1E-09
☐	Homeodomain[192]	4	1E-09
☐	ATPases associated with a variety of cellular acti[122]	4	1E-09
☐	Epidermal growth factor-like domain.[170]	5	1E-09
☐	Fibronectin type 3 domain[150]	3	1E-09
☐	Dual specificity phosphatase, catalytic domain[24]	2	1E-09
☐	Calcium-binding EGF-like domain[69]	5	1E-09
☐	Methyl-CpG binding domain[8]	2	1E-09
☐	Histone H2B[17]	2	1E-09

☐ And
 ☒ Or(Default)

Biointerpreter gives you list of significant protein domains with number of genes supporting the protein domain in the query list. Number within the square bracket [] with protein domain specifies the number of genes supporting the protein domain in the genome.

To view the genes involved in the particular protein domain:

- ii) Select the Domain by clicking on the corresponding check box.
- iii) Click the Table View button.

The list of genes associated with the selected protein domain will be displayed at result window with the following information:

- Query ID
- Unigene ID with link to detailed annotation
- Gene Name
- Gene symbol
- Protein domain ID (SMART ID) with link to SMART database
- Protein domain

Biointerpreter allows you to find genes which are associated with all the selected Protein domains.

Here is how:

- Select the Protein Domain by clicking on the corresponding check boxes.
- Select the AND radio button.
- Click the 'Table View' button.

Protein Domain

	Domain	No of genes	P value
☒	Immunoglobulin C-2 Type[153]	3	1E-09
☐	Kazal type serine protease inhibitors [37]	2	1E-09
☒	Homeodomain[192]	4	1E-09
☐	ATPases associated with a variety of cellular acti[122]	4	1E-09

☐ And
 ☒ Or(Default)

In the above figure, the user has selected **Immunoglobulin** and **Homeodomain**. We can get the genes which have both the protein domain by clicking on the table view. (Refer the table given below)

Gene list for Selected Protein Domain

[Description](#) (Click on Unigene to view detail annotation of the gene)

Query id	Unigene ID	Gene Symbol	Gene Name	ProteinDomainID	ProteinDomainName
Hs.109225	Hs.109225	VCAM1	Vascular cell adhesion molecule 1	SM00408	Immunoglobulin C-2 Type;
Hs.124503	Hs.124503	TCF8	Transcription factor 8 (represses interleukin 2 expression)	SM00389	Homeodomain;
Hs.168586	Hs.168586	TLX2	T-cell leukemia homeobox 2	SM00389	Homeodomain;
Hs.21422	Hs.21422	NRCAM	Neuronal cell adhesion molecule	SM00408	Immunoglobulin C-2 Type;

Link in the Unigene ID column will lead the detailed annotation for the gene. Biointerpreter has comprehensive, frequently updated annotation for the genes. ProteinDomain ID is linked to corresponding protein domain in [SMART](#) database.

Similarly, we can get the genes which are associated with any one of the selected protein domains:

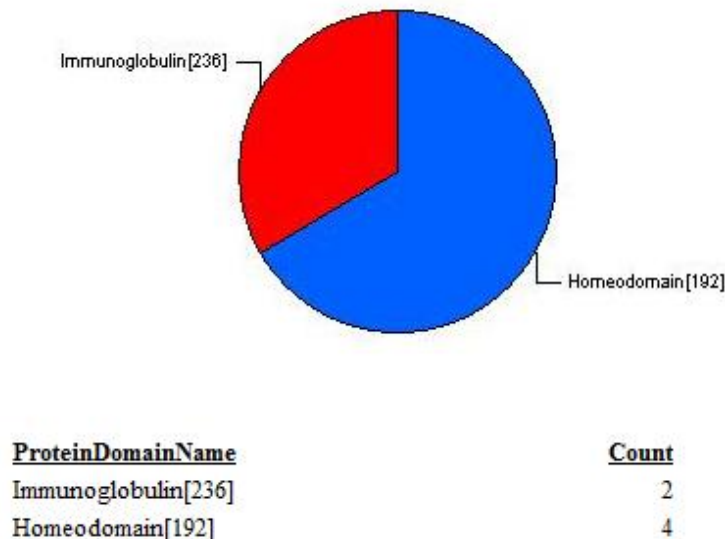
- i) Select the protein domain by clicking on the corresponding check box.
- ii) Select the OR radio button at the bottom
- iii) Click the 'Table View' button.

Biointerpreter displays the genes which are associated with any one of the selected protein domain, on result window.

To view the Pie Chart for the selected pathways:

- iv) Select the protein domain.
- v) Click the 'Pie Chart' button.

Biointerpreter displays the pie chart on result window.



Number in the square bracket [] shows the number of genes have the particular protein domain genome.

Ligand Binding

Protein Ligand

	Protein Ligand	No of genes	P value
☐	Tacrolimus [88]	3	1E-09
☐	NAD+ [194]	5	1E-09
☐	NADH [146]	3	1E-09
☐	NADPH [155]	3	1E-09
☐	NADP+ [155]	3	1E-09
☐	H+[284]	6	1E-09
☐	Protein[435]	7	1E-09
☐	Calcium [132]	3	1E-09

☐ And

☒ Or(Default)

Biointerpreter gives you list of significant protein ligands with number of genes supporting the protein ligand in the query list. Number within the square bracket [] with protein ligand specifies the number of genes supporting the protein ligand in the genome.

To view the genes involved in the particular protein domain:

- i) Select the Ligands by clicking on the corresponding check box.
- ii) Click the Table View button.

The list of genes associated with the selected protein domain will be displayed at result window with the following information:

- Query ID
- Unigene ID with link to detailed annotation
- Gene Name
- Gene symbol
- Protein ligand ID with link to KEGG ligand database
- Protein ligand

Biointerpreter allows you to find genes which are associated with all the selected Protein ligands.

Here is how:

- i) Select the Protein Ligand by clicking on the corresponding check boxes.
- ii) Select the AND radio button.
- iii) Click the 'Table View' button.

Protein Ligand			
	Protein Ligand	No of genes	P value
☐	Tacrolimus [88]	3	1E-09
☒	NAD+ [194]	5	1E-09
☐	NADH [146]	3	1E-09
☐	NADPH [155]	3	1E-09
☐	NADP+ [155]	3	1E-09
☒	H+[284]	6	1E-09
☐	Protein[435]	7	1E-09
Select All Clear ☐ And ☒ Or(Default) TableView Pie Chart			

In the above figure, the user has selected **NAD+** and **H+**. We can get the genes which have both the protein ligand binding sites by clicking on the table view. (Refer the table given below)

[Description](#) (Click on Unigene to view detail annotation of the gene)

Query id	Unigene ID	Gene Symbol	Gene Name	ProteinLigandID	ProteinLigandName
Hs.162795	Hs.162795	HSD17B2	Hydroxysteroid (17-beta) dehydrogenase 2	C00080 C00003	H+; NAD+ ;
Hs.190977	Hs.190977	ENPP2	Ectonucleotide pyrophosphatase/phosphodiesterase 2 (autotaxin)	C00003	NAD+ ;
Hs.202354	Hs.202354	DIO2	Deiodinase, iodothyronine, type II	C00080	H+;
Hs.272813	Hs.272813	DUOX1	Dual oxidase 1	C00080 C00003	H+; NAD+ ;
Hs.298280	Hs.298280	ATP5A1	ATP synthase, H+ transporting, mitochondrial F1 complex, alpha subunit 1, cardiac muscle	C00080	H+;

Link in the Unigene ID column will lead the **detailed annotation** for the gene. Biointerpreter has comprehensive, frequently updated annotation for the genes. ProteinLigand ID is linked to corresponding protein ligand in KEGG ligand database.

Similarly, we can get the genes which are associated with any one of the selected protein ligands:

- iv) Select the protein ligand by clicking on the corresponding check box.
- v) Select the OR radio button at the bottom
- vi) Click the 'Table View' button.

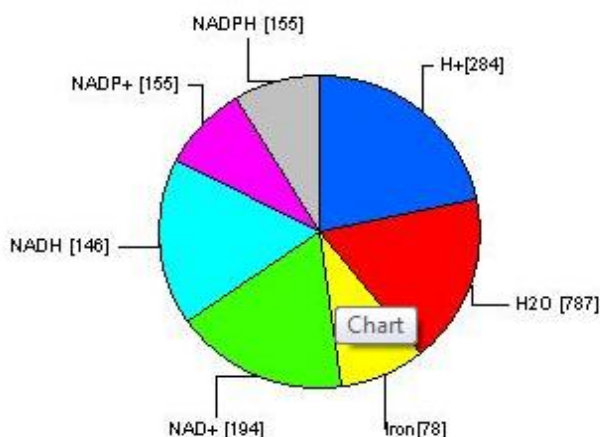
Biointerpreter displays the genes which are associated with any one of the selected protein domain, on result window.

To view the Pie Chart for the selected Ligand:

- i) Select the protein ligand.
- ii) Click the 'Pie Chart' button.

Biointerpreter displays the pie chart on result window.

ProteinLigand



<u>ProteinLigandName</u>	<u>Count</u>
H2O [787]	4
NAD+ [194]	4
NADH [146]	4
H+ [284]	5
Iron [78]	2
NADPH [155]	2
NADP+ [155]	2

Number in the square bracket [] shows the number of genes have the particular protein ligand binding sites in genome.

Mutation

Mutation

	Mutation	No of genes	P value
☐	Missense/nonsense[1604]	22	1E-09
☐	Splicing[776]	12	1E-09
☐	Regulatory[308]	6	1E-09
☐	Small insertions[656]	9	1E-09
☐	Complex rearrangements[203]	4	1E-09
☐	Gross insertions[182]	3	0.0001
☐	Small deletions[927]	12	1
☐	Small indels[349]	4	1
☐	Gross deletions[524]	6	1

[Select All](#)
[Clear](#)
☐ And

☐ Or(Default)

[TableView](#)
[Pie Chart](#)

Biointerpreter gives you list of significant mutation in the query list. Number within the square bracket [] with mutation specifies the number of genes supporting the mutation type in the genome.

To view the genes for a particular mutation type:

- i) Select the Mutation by clicking on the corresponding check box.
- ii) Click the Table View button.

The list of genes associated with the selected mutation will be displayed at result window with the following information:

- Query ID
- Unigene ID with link to detailed annotation
- Gene Name
- Gene symbol
- Mutation type with Link to “Human Gene Mutation Database”.

Biointerpreter allows you to find genes which are associated with all the selected Mutations.

Here is how:

- Select the Mutation by clicking on the corresponding check boxes.
- Select the AND radio button.
- Click the 'Table View' button.

Mutation

	Mutation	No of genes	P value
☐	Missense/nonsense[1604]	22	1E-09
☐	Splicing[776]	12	1E-09
☒	Regulatory[308]	6	1E-09
☐	Small insertions[656]	9	1E-09
☐	Complex rearrangements[203]	4	1E-09
☐	Gross insertions[182]	3	0.0001
☐	Small deletions[927]	12	1
☐	Small indels[349]	4	1
☐	Gross deletions[524]	6	1

☐ And ☐ Or(Default)

In the above figure, the user has selected **Regulatory**. We can get the genes which have the mutation types by clicking on the table view. (Refer the table given below)

Gene list for Selected Gene Mutation

Description

Query id	Unigene ID	Gene Symbol	Gene Name	Mutation
Hs.120759	Hs.120759	APOB	Apolipoprotein B (including Ag(x) antigen)	Regulatory
Hs.163867	Hs.163867	CD14	CD14 molecule	Regulatory
Hs.2030	Hs.2030	THBD	Thrombomodulin	Regulatory
Hs.2250	Hs.2250	LIF	Leukemia inhibitory factor (cholinergic differentiation factor)	Regulatory
Hs.2256	Hs.2256	MMP7	Matrix metalloproteinase 7 (matrilysin, uterine)	Regulatory
Hs.375129	Hs.375129	MMP3	Matrix metalloproteinase 3 (stromelysin 1, procollagenase)	Regulatory

Link in the Unigene ID column will lead the **detailed annotation** for the gene. Biointerpreter has comprehensive, frequently updated annotation for the genes. Mutation is linked to corresponding gene in Human gene mutation database.

Similarly, we can get the genes which are associated with any one of the selected Mutation:

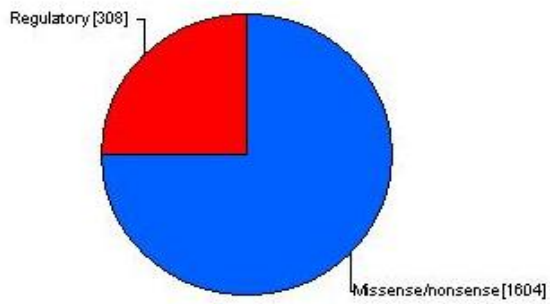
1. Select the mutation by clicking on the corresponding check box.
2. Select the OR radio button at the bottom
3. Click the 'Table View' button.

Biointerpreter displays the genes which are associated with any one of the selected mutation type, on result window.

To view the Pie Chart for the selected Mutation:

- Select the Mutation type.
- Click the 'Pie Chart' button.

Biointerpreter displays the pie chart **on result window**.



<u>Mutation</u>	<u>Count</u>
Missense/nonsense[1604]	15
Regulatory[308]	5

Number in the square bracket [] shows the number of genes supports the particular mutation type in genome.

Phenotype

Phenotype

	Phenotype	No of genes	P value
☐	adipose tissue phenotype[198]	5	1E-09
☐	cardiovascular system phenotype [919]	23	1E-09
☐	cellular phenotype[630]	14	1E-09
☐	craniofacial phenotype[417]	11	1E-09
☐	embryogenesis phenotype[803]	24	1E-09
☐	endocrine/exocrine gland phenotype [742]	16	1E-09
☐	growth/size phenotype[1527]	36	1E-09
☐	hearing/ear phenotype[257]	5	1E-09
☐	hematopoietic system phenotype [928]	21	1E-09
☐	homeostasis/metabolism phenotype [1250]	26	1E-09

☐ And
 ☒ Or(Default)

Biointerpreter gives you list of significant phenotype found in the query list. Number within the square bracket [] with phenotype specifies the number of genes supporting the phenotype in the genome.

To view the genes for a particular Phenotype:

- i) Select the Phenotype by clicking on the corresponding check box.
- ii) Click the Table View button.

The list of genes associated with the selected phenotype will be displayed at result window with the following information:

- Query ID
- Unigene ID with link to detailed annotation
- Gene Name
- Gene symbol
- Phenotype ID
- Phenotype

Biointerpreter allows you to find genes which are associated with all the selected Mutations.

Here is how:

- Select the Phenotype by clicking on the corresponding check boxes.
- Select the AND radio button.
- Click the 'Table View' button.

Phenotype

	Phenotype	No of genes	P value
☐	adipose tissue phenotype[198]	5	1E-09
☒	cardiovascular system phenotype [919]	23	1E-09
☐	cellular phenotype[630]	14	1E-09
☒	craniofacial phenotype[417]	11	1E-09
☐	embryogenesis phenotype[803]	24	1E-09
☐	endocrine/exocrine gland phenotype [742]	16	1E-09
☐	growth/size phenotype[1527]	36	1E-09

Select All
Clear
☐ And
☒ Or(Default)
TableView
Pie Chart

In the above figure, the user has selected **cardiovascular system phenotype** and **craniofacial phenotype**. We can get the genes which have both the phenotypes by clicking on the table view. (Refer the table given below)

Gene list for Selected phenotype**Description** (Click on Unigene to view detail annotation of the gene)

Query id	Unigene ID	Gene Symbol	Gene Name	phenotype Id	Phenotype
Hs.109225	Hs.109225	VCAM1	Vascular cell adhesion molecule 1	MP:0005385	cardiovascular system phenotype;
Hs.120759	Hs.120759	APOB	Apolipoprotein B (including Ag(x) antigen)	MP:0005385	cardiovascular system phenotype;
Hs.124503	Hs.124503	TCF8	Transcription factor 8 (represses interleukin 2 expression)	MP:0005382 MP:0005385	craniofacial phenotype; cardiovascular system phenotype;
Hs.133397	Hs.133397	ITGA6	Integrin, alpha 6	MP:0005382	craniofacial phenotype;
Hs.136348	Hs.136348	POSTN	Periostin, osteoblast specific factor	MP:0005382 MP:0005385	craniofacial phenotype; cardiovascular system phenotype;

Link in the Unigene ID column will lead the **detailed annotation** for the gene. Biointerpreter has comprehensive, frequently updated annotation for the genes. Phenotype ID is linked to corresponding phenotype in the Mammalian phenotype browser.

Similarly, we can get the genes which are associated with any one of the selected Phenotype:

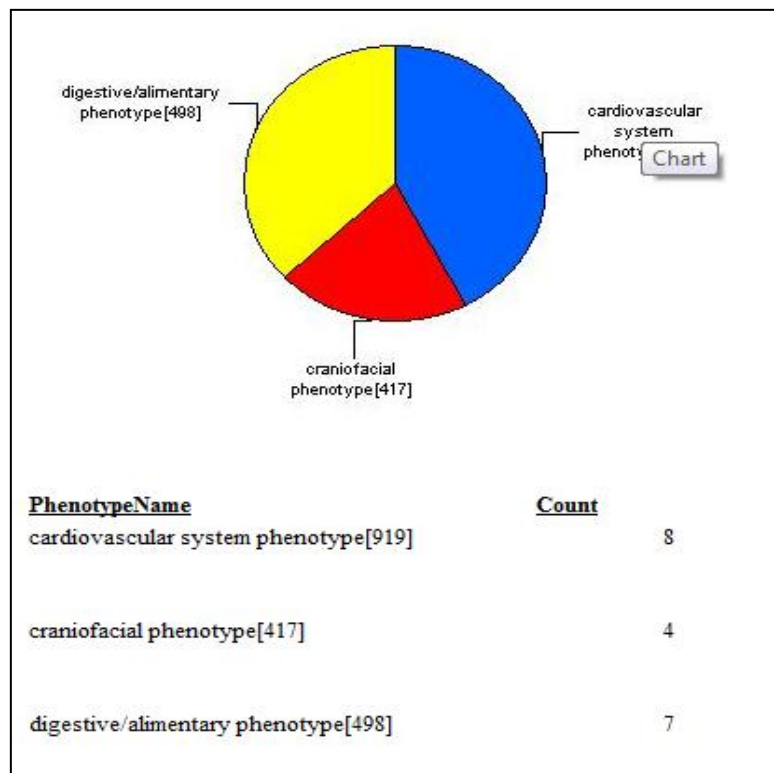
- Select the Phenotype by clicking on the corresponding check box.
- Select the OR radio button at the bottom
- Click the 'Table View' button.

Biointerpreter displays the genes which are associated with any one of the selected phenotype, on result window.

To view the Pie Chart for the selected Phenotype:

- Select the phenotype.
- Click the 'Pie Chart' button.

Biointerpreter displays the pie chart **on result window**.



Number in the square bracket [] shows the number of genes supports the particular phenotype in genome.

Detailed Annotation

This detailed annotation report displays a comprehensive annotation for the queried gene.

Unigene ID - Retrieved from Unigene build #199 (19 Jan 2007)

Functional Annotation - Lists the molecular and biological functions. The functions were obtained from updated annotations available in our database.

Gene Expression Data: Gene expression data is manually collected from published research articles. These are usually differentials that are either validated or the top most up or down regulated genes from the study. (Genotypic technology unpublished data)

Genotypic Curation - List of associated functions / diseases for the gene with the number of pubmed references in bracket. These phrases were obtained from published research articles by automated methods. (Genotypic Technology unpublished data).
Ex,. Apoptosis [5] - This gene is related to apoptosis and there are 5 evidences / references retrieved from Pubmed.

GenoRIF (Genotypic References into Function)

Displays the references / Evidence obtained from the published articles for the all functions / diseases displayed in the Genotypic Curation. These phrases were obtained from the published research articles by automated methods.

GeneRIF: Displays the concise phrase describing a function or functions curated from published scientific articles

1. a concise phrase describing a function or functions
2. A published paper describing that function, implemented by supplying the PubMed ID of a citation in PubMed. [Link to GeneRIF](#).

Gene Summary: Displays the descriptive text about the gene, its cellular localization, its function, and its effect on phenotype.

Gene Ontology: Describes gene products in terms of their associated biological processes, cellular components and molecular functions in a species-independent manner. GO ID will leads to the corresponding gene ontology term description in the [Gene Ontology](#) website.

Protein Ontology: Describes proteins in terms of their associated biological processes, cellular components and molecular functions in a species-independent manner. This data was retrieved from [Swissprot](#).

Protein Function: General description of the function(s) of a protein as derived from [Swissprot](#).

Keyword: The keyword is a subject reference which provides information that can be used to generate indexes of the protein entries based on functional, structural, or other categories as derived from [Swissprot](#).

Kegg Pathway: KEGG PATHWAY is a collection of manually drawn pathway maps representing molecular interactions and reaction networks for metabolism, human diseases, cellular processes etc.

The link in the KEGG ID will lead the corresponding pathway in the KEGG pathway database. Link to [KEGG PATHWAY](#).

Similarity: Description of the similarities (sequence or structural) of a protein with other proteins as derived from [Swissprot](#).

List of functions curated and related keywords by Genotypic

Function	Related Keywords
Activation	Activator ; Activation ; Activate
Ageing	Senescence ; Aging ; Ageing
Angiogenesis	VEGF ; Endothelial Growth ; Endothelial Cell Growth ; Angiopoietin ; Angiogenetic ; Angiogenesis ; Angiogen
Antigen Processing And Presentation	Macrophage ; Dendritic ; B-Cell ; B Cell ; Mhc ; Histocompatibility ; Antigen Presenting Cell ; Antigen Presentation ; Antigen Processing
Apoptosis	Suicide ; Programmed Cell Death ; Pro-Apoptotic ; Pro-Apoptosis ; Caspase ; Apoptotic ; Apoptosis ; Apoptogen ; Apoptin ; Anti-Apoptotic ; Anti-Apoptosis
Autophagocytosis	Type II Cell Death ; Cytoplasmic Cell Death ; Autophagy ; Autophagocytosis ; Auto Phagocytosis ; Auto Phago Cytosis
Biosynthesis	Bio-Synthetic ; Biosynthetic ; Bio-Synthesis ; Biosynthesis ; Bio Synthetic ; Bio Synthesis
Cell Adhesion	Integrin ; Sticky ; Stick ; Selectin ; Catenin ; Cadherin ; Adhesion ; Adherence ; Adhere
Cell Cycle	Meiosis ; Mitotic ; Mitosis ; Mitogen ; Meiotic ; Cytokinesis ; Telophase ; S Phase ; Restriction Point ; Pro-Phase ; Prophase ; Pro-Metaphase ; Prometaphase ; Meta-Phase ; Metaphase ; M Phase ; Inter-Phase ; Interphase ; G2 Phase ; G1 Phase ; Cyclin Dependant ; Checkpoint ; Cell Division Cycle ; Cell Cycle ; Cdk ; Anaphase
Cell Differentiation	Totipotent ; Stem Cells ; Stem Cell ; Somatic Cell ; Pluripotent ; Lineage ; Germ Cell ; Cell Differentiation
Cell Division	Meiosis ; Mitotic ; Mitosis ; Mitogen ; Meiotic ; Cytokinesis ; Fission ; Dividing Cell ; Daughter Cells ; Cellular Division ; Cell Division ; Budding
Cell Migration	Cellular Movement ; Cell Spreading ; Cell Movement ; Cell Motility ; Cell Migration
Cell Morphogenesis	Spindle Positioning ; Polarity ; Morphogenesis ; Cell Size ; Cell Shape ; Cell Patterning ; Biogenesis
Cell Plasticity	Plasticity
Cell Proliferation	Proliferation ; Proliferating
Cellular Trafficking	Trafficking ; Traffic ; Cellular Transport
Chemotaxis	Chemotaxis ; Chemotaxin ; Chemotactic ; Chemotaxic ; Chemotactin ; Chemoattractant
Chromosomal Segregation	Meiosis ; Kinetochore ; Centromere ; Tubulin ; Sister Chromatid ; Separin ; Securin ; Motor Protein ; Monopolin ; Microtubules ; Condensin ; Cohesion ; Cohesin ; Chromosome Segregation ; Chromosomal Segregation
Complement Activation	Opsonisation ; Complement Coagulation ; Complement Activation ; Classical Pathway ; Alternative Pathway

Degeneration	Degenerative ; Degeneration ; Degenerate ; Degeneracy
Dna Machinery	Replication ; Recombination ; Polymerase ; Ligase ; Endonuclease ; Dna Machinery
Dna Repair	Dna Repair ; Mismatch Repair ; Excision Repair
Drug Response	Toxicity ; Toxic ; Pharmacokinetics ; P450 ; Drug Tolerance ; Drug Response ; Drug Resistance ; Drug Metabolism ; Drug Effect ; Drug Distribution ; Drug Absorption ; Dose Effect ; Bioequivalence ; Bioavailability
Endocytosis	Phagocytosis ; Pinocytosis ; Engulf ; Endocytosis ; Cell Eating ; Cell Drinking
Exocytosis	Vesicle Trafficking ; Vesicle Tethering ; Vesicle Priming ; Vesicle Fusion ; Vesicle Docking ; Exocytosis
Extracellular Matrix Remodeling	Integrin ; Focal Adhesion ; Integrin Binding ; Focal Contacts ; Focal Adhesions ; Extracellular Matrix
Gene Regulation	Transcriptional Regulation ; Temporal Regulation ; Repressible ; Repressed ; Regulation ; Regulates ; Modification ; Initiation ; Initiate ; Inducible ; Induced ; Gene Regulation ; Elongation ; Elongate ; Coordinate ; Allosteric Effects
Growth Factors And Regulators	Ligand ; Hormone ; Growth Factor ; Thrombopoietin ; Neutrophin ; Neurotrophins ; Myostatin ; Granulocyte ; Erythropoietin ; Colony Stimulating
Hemostasis	Styptic ; Hemostasis ; Hemostasia ; Haemostasis ; Haemostasia ; Coagulation
Homeostasis	Osmotic ; Osmosis ; Homeostatic ; Homeostasis
Housekeeping	Housekeep ; Cell Maintenance
Immune Response	Phagocytosis ; Macrophage ; Chemotaxis ; Neutrophil ; Dendritic ; Cytokine ; B-Cell ; B Cell ; T-Cell ; T Cell ; Phagocyte ; Opsonization ; Natural Killer Cells ; Natural Killer Cell ; Lymphokine ; Innate ; Immunogen ; Immuno ; Immunized ; Immunize ; Immunity ; Immune ; Defense ; Cytolysis ; Chemokine ; Antigen ; Antibody
Infection	Pathogenesis ; Pathogen ; Invasion ; Infectious ; Infection ; Infected ; Infect
Inflammation	Macrophage ; Chemotaxis ; Neutrophil ; Cytokine ; Chemotaxis ; Chemotactic ; Wound ; Vaso Active ; Serotonin ; Redness ; Prostaglandin ; Prostacyclin ; Membrane Attack ; Lymphocyte ; Interleukin ; Interferon ; Inflamed ; Inflammatory ; Inflammation ; Ige ; Hypersensitivity ; Histamine ; Healing ; Fever ; Eosinophil ; C5A ; C3B ; C3A ; Bradykinin
Membrane Fusion	Syntaxin ; Synaptotagmin ; Synaptobrevin ; Membrane Fusion
Metabolism	Enzyme ; Metabolism ; Metabolic ; Enzymatic ; Catabolism ; Catabolic ; Anabolism ; Anabolic
Negative Gene Regulation	Negative Regulation ; Negative gene regulation

Neuronal	Spinal ; Neuronal ; Neuro ; Neural ; Nerve ; Brain ; Axon
Oncogenesis	Tumourogenesis ; Oncogene ; Oncogen
Phagocytosis	Phagocytosis ; Phagocytic
Positive Gene Regulation	Positive Regulation ; Positive Gene Regulation
Post Translational Modifications	Signal Peptide ; Sulfation ; Seleno ; Prenylation ; Phosphorylation ; Methylation ; Glycosylation ; Deamidation ; Cleavage ; Carboxylation ; Acylation ; Acetylation ; Proteolytic cleavage ; Post Translational Modifications
Protein Sorting	Signal Peptide ; Proteolysis ; Signal Sequence ; Signal Recognition ; Protein Sorting ; Golgi Apparatus
Receptors / Ligand Mediation	Receptor ; Ligand
RNA Machinery	Translation ; Transcription ; Splicing ; Rna Processing ; Rna Polymerase ; Rna Metabolism ; Rna Break ; Rna Binding ; Polyadenylation ; Cap Addition
Signal Transduction	Second Messenger ; Receptor ; Hormone ; Growth Factor ; Steroid ; Signalling ; Signaling ; Signal Transduction Cascade ; Signal Transduction ; Second Messengers ; Phosphatase ; Nuclear ; Kinase ; Cyclic
Splice Variant	Splicing ; Spliciozomes ; Spliciozome ; Splice Variant
Stress	Dna Repair ; Uv ; Stress ; Starvation ; Shock ; Irradiation ; Irradiate ; Hypoxia ; Dna Damage
Suppressors	Suppressor ; Suppress ; Suppressor
Toxicity	Toxicity ; Toxic ; Toxin ; Toxicology ; Poisoning ; Neurotoxin ; Neurotoxic ; Hepatotoxin ; Hepatotoxic ; Hemotoxin ; Hemotoxic ; Cytotoxicity ; Cytotoxic
Transcription	Transcription
Transcription Regulation	Transcription Regulation ; Transcription Factor ; Regulation Of Transcription
Translation	Translation ; Translated
Transport	Transportation ; Transport ; Pump ; Efflux ; Channel
Transposable Element	Transposons ; Transposon ; Transposable Element ; Jumping Gene
Vasculogenesis Vesicle Trafficking	Vasculogenesis ; Vascular Vesicle Trafficking ; Vesicle Tethering ; Vesicle Priming ; Vesicle Fusion ; Vesicle Docking ; Transcytosis

List of Diseases curated by Genotypic with related keywords:

Disease Name	Related keywords
Addison's Disease	Addison ; adrenal insufficiency ; hypocortisolism ; Adrenocortical hypofunction ; cortical insufficiency ; adrenocortical insufficiency ; bronzed disease ; bronze skin disease ; chronic hypoadrenocorticism ; melasma suprarenale ; suprarenal melasma
African Trypanosomiasis	Sleeping sickness ; trypanosomiasis ; tsetse fly ; Trypanosoma brucei
Aids	hiv ; aids ; human immunodeficiency ; Kaposi sarcoma ; acquired immunodeficiency
Alexander Disease	Alexander disease ; Leukodystrophy ; Megalobare ; Hyaline Panneuropathy ; Hyaline Inclusion ; Megalencephaly
Alopecia	alopecia
Alper'S Syndrome	Alper's disease ; progressive infantile poliodystrophy ;
Alzheimer Disease	Alzheimer ; Presenile dementia ; senile dementia ; Primary Senile Degenerative Dementia
Amoebiosis	Amoebiasis ; Entamoeba histolytica ; Amoeba
Amyotrophic Lateral Sclerosis	ALS ; Amyotrophic Lateral sclerosis ; Lou Gehrig's disease ; Maladie de Charcot
Anal Cancer	Anal Cancer ; colorectal cancer ; human papillomavirus ; HPV
Anemia	anaemia ; anaemic ; anemic
Anthrax	Anthrax ; Bacillus anthracis ; splenic fever ; Woolsorters' disease ; Ragpickers' disease
Arthritis	Arthritis ; Gout and pseudogout ; Still's disease ; Ankylosing spondylitis ; joint inflammation ; inflammation of joint
Aspergillosis	Aspergillus ; Aspergillosis
Asthma	Asthma ; wheezing ; wheezy ; status asthmaticus ; bronchospasm ; asthmatic
Batten Disease	Spielmeyer Vogt ; Sjogren ; Batten disease ; Curschmann ; batten Steinert syndrome ; Batten's syndrome ; Gibb syndrome ; Rossolimo ; Steinert myotonic dystrophy ; Congenital myotonic dystrophy ; dystrophia myotonica ; myotonia dystrophica.
Bladder Cancer	Bladder Cancer ; transitional cell carcinoma ; bladder carcinoma
Blastomycosis	Blastomycosis ; Chicago Disease ; Gilchrist's disease ;
Bone Cancer	Bone Cancer ; Osteosarcoma ; Malignant Fibrous Histiocytoma
Brain Tumor	Brain Tumor ; intracranial tumor ; ganglioglioma ; disembryoplastic neuroepithelial tumor ; oligoastrocytoma ; oligodendroglioma
Breast Cancer	Breast carcinoma ; Mammary cancer ; breast cancer ; mammary carcinoma ; breast tumor
Canavan Disease	Canavan ; ACY2 Deficiency ; ASP Deficiency ; ASPA Deficiency ; Aminoacylase ; 2 Deficiency ; Aspartoacylase Deficiency ; Bertrand Disease ; Spongy Degeneration of the Central Nervous System ; Van Bogaert ; Bertrand Syndrome

Cervical Cancer	Cervical cancer ; cervix tumor ; cervical carcinoma
Chagas Disease	Chagas Disease ; Trypanosoma cruzi ; Schizotrypanum cruzi ; American trypanosomiasis
Chickenpox	Chicken pox ; Varicella ; VZV ; chickenpox
Cholera	Cholera ; Vibrio cholerae ;
Chronic Obstructive Pulmonary Disease	Chronic obstructive pulmonary disease ; COPD ; chronic bronchitis ; emphysema
Cicatrix	scar ; cicatrix ; cicatrice
Coccidioidomycosis	Coccidioidomycosis ; Valley fever
Cockayne Syndrome	Weber ; Cockayne syndrome ; Neill ; Dingwall Syndrome
Colon Cancer	Colorectal cancer ; bowel cancer ; adenomatous polyps ; colon cancer ; colorectal carcinoma ; colon carcinoma
Color Blindness	monochromasy ; color sensation ; color blindness
Common Cold	common cold ; Acute nasopharyngitis ; rhinovirus ; coronavirus ; echovirus ; paramyxovirus ; coxsackievirus
Coronary Heart Disease	Coronary Artery disease ; arterial plaque ; atherosclerosis ; Angina ; Arrhythmia
Creutzfeldt-Jakob Disease	Jakob ; Creutzfeldt ; Spastic pseudosclerosis ; abiotrophic dementia ; corticopallidospinal degeneration ; corticostriatal ; spinal degeneration syndrome ; spongiform cerebral atrophy
Crohn'S Disease	Crohn ; regional enteritis ; regional ileitis ; granulomatous enterocolitis ; segmental enteritis ; segmental ileitis ; terminal ileitis ; Lesniowsky
Cryptococcosis	Cryptococcosis ; European blastomycosis ; torulosis ;
Cushing'S Syndrome	hypercortisolism ; cushing
Cystic Fibrosis	CFTR ; Cystic fibrosis ; Fibrocystic Disease ; Mucoviscidosis
Dengue Fever	Dengue ; Aedes aegypti ; break bone fever ; Flavivirus
Diabetes	Diabetes ; diabetic ; hyperglycemia ; IDDM ; NIDDM ; chamber pot dropsy ; thirst disease ; sugar disease ; sugar sickness ; GDM ; hypoglycemia ; end stage renal disease ; ESRD ; type 2 DM ; hyperosmolar nonketotic syndrome ; HHNS ; HNKS ; retinopathy ; metabolic syndrome ; syndrome X
Diabetes Mellitus Type1	ketosis prone diabetes ; autoimmune diabetes mellitus ; brittle diabetes mellitus ; diabetic ketoacidosis ; DKA ; maturity onset diabetes ; MODY ; gestational diabetes mellitus ; GDM ; chamber pot dropsy ; latent autoimmune diabetes of the adult ; LADA ; diabetes mellitus type1
Diphtheria	Diphtheria ;
Dyspepsia	indigestion ; dyspepsia ; stomach upset ; upset stomach
Ebola Haemorrhagic Fever	Ebola fever ; Filoviridae ;

Endometrial Cancer	Endometrial Cancer ; endometrial carcinoma
Fever	fever ; febrility ; febricity ; pyrexia ; pyrogen ; pyrogenic ; feverish
Fibrosis	Fibros ; Myelofibrosis ; fibrosis ; fibrocystic disease of the pancreas ; mucoviscidosis
Filariasis	Filariasis ; Wuchereria bancrofti ; Brugia malayi ; Brugia timori ; elephantiasis ; filaria
Gastroenteritis	gastroenteritis ; rotavirus ;
Giardiasis	Giardiasis ; beaver fever ; Giardia lamblia ;
Glaucoma	glaucoma ; intraocular pressure ; optic nerve damage
Goodpasture'S Syndrome	Goodpasture ; pulmonary haemorrhage syndrome ; interstitial nephritis ; pneumorenal syndrome ; glomerulonephritis ; renopulmonal syndrome
Graves'Disease	Grave ; goiter ; hyperthyroidism ; thyrotoxicosis ; Flajani ; Basedow ; Marsh ; Parry
Guillain-Barré Syndrome	Guillian-Barre syndrome ; Landry's Ascending Paralysis ; Acute Inflammatory Demyelinating Polyradiculoneuropathy ; acquired demyelinating neuropathy
Head And Neck Cancer	Head cancer ; Neck cancer ; squamous ; head and neck
Heart Disease / Cardiomyopathy	Heart disease ; cardiac arrhythmia ; cardiomyopathy ; cardiomyopathic
Hemophilia	Hemophilia ; bleeder disease ; haemophilia ; uncontrolled bleeding ;
Hepatitis	Hepatitis ;
Hepatocellular Carcinoma	liver cancer ; hepatocellular carcinoma
Herpes Simplex	Herpes simplex ; Cold Sore ; Night Fever ; Fever Blister ;
Herpes Zoster	Herpes zoster ; shingles ; varicella zoster virus
Histoplasmosis	Histoplasma ; Histoplasmosis
Human Papillomavirus	HPV ; skin warts ; Pappilloma virus
Hyperlipidemia	hyperlipemia ; hyperlipaemia ; hyperlipidemia ; hyperlipidaemia ; hyperlipoidemia ; hyperlipoidaemia
Infertility	infertiliy ; sterility ; impotence ; impotency ; unfertile
Influenza	Influenza ; Flu ; Orthomyxoviridae
Kidney Cancer	Kidney cancer ; Renal cell carcinoma ;
Lafora Disease	spinal bulbar muscular atrophy ; Lafora ; Baltic myoclonus ; Unverricht
Leishmaniasis	Leishmania ; sandfly ; kala azar ; black fever ; sandfly disease ; dum-dum fever ; espundia ;
Leprosy	Hansen ; Mycobacterium leprae ; Lepromin test ; leprosy
Leukemia	leukemia ; leukaemia ; leucaemia ; cancer of the blood ; malignant neoplasm of blood ; blood cancer ; leukemic

Lung Cancer	Lung cancer ; bronchogenic carcinoma ; bronchoalveolar carcinoma ; oat cell carcinoma ; lung carcinoma
Lupus Erythematosus	Lupus erythematosus ; chronic inflammatory disorder ; SLE ; Discoid Lupus erythematosus ; DLE ;
Lyme Disease	Lyme ; Borrelia burgdorferi ; Tick borne meningopolyneuritis ; Bujadoux syndrome ; Bannwarth syndrome ; sheep tick fever
Lymphoma	Lymph tissue malignancy ; lymphoma ; tumor of the B lymphocytes ; NHL
Malaria	Malaria ; ague fever ; marsh fever ; Plasmodium
Measles	Measles ; rubeola ; Morbillivirus. ; Koplik
Motor neuron disease	motor neuron
Myasthenia Gravis	Myasthenia gravis
Myeloma	myeloma
Obesity	Obesity ; corpulency ; overweight ; stoutness ; adiposis ; embonpoint ; obese
Obsessive-Compulsive Disorder	Janet ; Psychastenia ; obsessive compulsive disorder
Ovarian Cancer	Ovarian cancer ; malignant ovarian neoplasm ; ovarian carcinoma
Pancreatic Cancer	Pancreatic cancer ; neuroendocrine tumor ; pancreatic carcinoma
Parkinson Disease	Parkinson ; Progressive supranuclear palsy ; Parkinsonism ; Paleostriatal syndromespasmus agitans ; pallidal syndrome ; pallidum syndrome ; paralysis agitans ; shaking palsy ; spasmus agitans ; paralysis agitans
Pertussis	whooping cough ; pertussis ;
Pick'S Disease	Crocker ; Farber ; Niemann ; Pick ; Ludwig ; lipid histiocytosis ; phosphatidolipoidosis ; phosphatidosis ; sphingomyelin lipidosis ; sphingomyelinosis ; sphingomyelin reticuloendotheliosis
Plague	pestilence ; Yersinia pestis ; Black Death ; rat flea ; Xenopsylla cheopis ; plague
Pneumonia	Pneumonia ; pneumoniae ;
Poliomyelitis	infantile paralysis ; acute flaccid paralysis ; AFP ; polio
Prion Disease	Prion ; Kuru ; Scrapie
Prognosis & Diagnosis	marker ; prognosis ; diagnosis ; prognostic ; diagnostic
Prostate Cancer	Prostate Cancer ; adenocarcinoma ; glandular cancer ; prostatic intraepithelial neoplasia ; prostate carcinoma
Psoriasis	Psoriasis ; Koebner ; acanthosis
Pus	purulence ; purulency ; purulent
Rabies	Lyssavirus ; Rabies ;
Reiter'S Disease	Fiesinger ; Reiter ; Waelsch ; arthritic spirochaetosis ; arthritis dysenterica ; arthritis urethrica ; blenorrhagic balantiform keratoderma ; blenorrhagic idiopathic arthritis ; conjunctivo-urethrosynovial syndrome ; infectious uroarthritis ; nongonococcal

	urethritis ; oculo-urethroarticular syndrome ; polyarthritis enterica ; polyarthritis urethritica simplex ; postdysenteric arthritis ; postdysenteric rheumatoid ; postdysenteric syndrome ; Ruhr rheumatism ; postenteric rheumatoid ; reactive arthritis ; sexually acquired reactive arthritis ; spirochaetosis arthritica ; urethral arthritis ; urethral rheumatism ; urethro-oculo-articular syndrome ; urethro-oculosynovial syndrome ; uroarthritis ; venereal arthritis ; reiter's disease
Retinoblastoma	ocular tumor of retina ; retinoblastoma
Rheumatoid Arthritis	Rheumatoid arthritis ; rheumatic gout ; rheumatoid disease ; Still Disease ; Juvenile Idiopathy
Rhinitis	Rhinitis ; coryza ; rubor ; rhinitic
Salivary Gland Cancer	Salivary gland Cancer ; mucoepidermoid carcinoma
Salmonella	Salmonella ; typhoid ; paratyphoid
Schizophrenia	Schizophrenia ; dementia ; paranoid
scleroderma	scleroderma ; systemic sclerosis ; hard skin ; sclerodactyly
Severe Acute Respiratory Syndrome	Severe acute respiratory Syndrome ; atypical pneumonia ; SARS ; coronavirus ;
Shigellosis	Shigellosis; bacillary dysentery; Shigella. ;
Smallpox	Small pox ; Variola ; Vaccinia ; Orthopoxvirus
Spasm	spasm ; cramp ; muscle spasm
Syndrome	syndrome
Tetanus	Tetanus ; neurotoxin tetanospasmin ; Clostridium tetani ; lockjaw ; trismus ;
Thalassemia	Mediterranean anemia ; Mediterranean anaemia ; Cooley ; thalassemia ; thalassaemia
Thrombosis	Clotting ; coagulation ; clabber ; clot ; clog ; platelet ; thrombocyte ; thrombosis ; Thromboembolism ; coagulate
Thyroid Cancer	Thyroid Cancer ; papillary ; follicular ; papillary carcinoma ; follicular carcinoma
Tinea Pedis	Tinea pedis ; Ringworm ; Athlete's foot ; dermatophytosis palmaris
Tuberculosis	Pott's disease ; tuberculosis ; phthisis ; white plague ; king's evil ; lupus vulgaris
Typhoid Fever	Typhoid ; enteric ; Salmonella Typhi
Ulcer	ulcer ; lesion
Viral Encephalitis	viral encephalitis
Vitiligo	vitiligo ; depigmentation ; hypopigmentation ; loss of melanin ; hypomelanosis ; leukotrichia
Vonhippel-Lindau Syndrome	Lindau ; angiomatosis ;
Yellow Fever	yellow jack ; black vomit ; American Plague ; Aedes simpsoni ; Haemagogus ; Sabethes ; yellow fever

List of Sub cellular localization curated by Genotypic with related keywords

Sub-cellular location	Related keywords
Centrosome	centrosome ; central body
Cytoplasm	cytoplasm ; cytosol
Cytoskeleton	cytoskeleton
Endoplasmic Reticulum	reticulum
Endosome	endosome ; endocytic vesicles ; clathrin-coated pits
Extracellular	extracellular ; serum ;
Golgi Apparatus	golgi ; vesicular-tubular cluster ; Dictyosome
Integral to membrane	integral to membrane ; integral membrane
Lysosomes	lysosome
Microsome	microsome
Mitochondria	mitochondria
Nucleolus	nucleolus ; nucleole
Nucleus	nucleus ; nuclear ; transcription factor ;
Peroxisome	peroxisome ; selective protein import ; peroxin proteins
Plasma Membrane	plasma membrane ; plasmalemma ; cell membrane ; lipid bilayer
Ribosomes	ribosome ; polysomes
Sarcoplasmic Reticulum	sarcoplasmic reticulum
Secreted	secrete ; exude ; exudate ; transude ; ooze
Vacuoles	vacuoles
Vesicles	vesicle ; vesicular ; cyst